

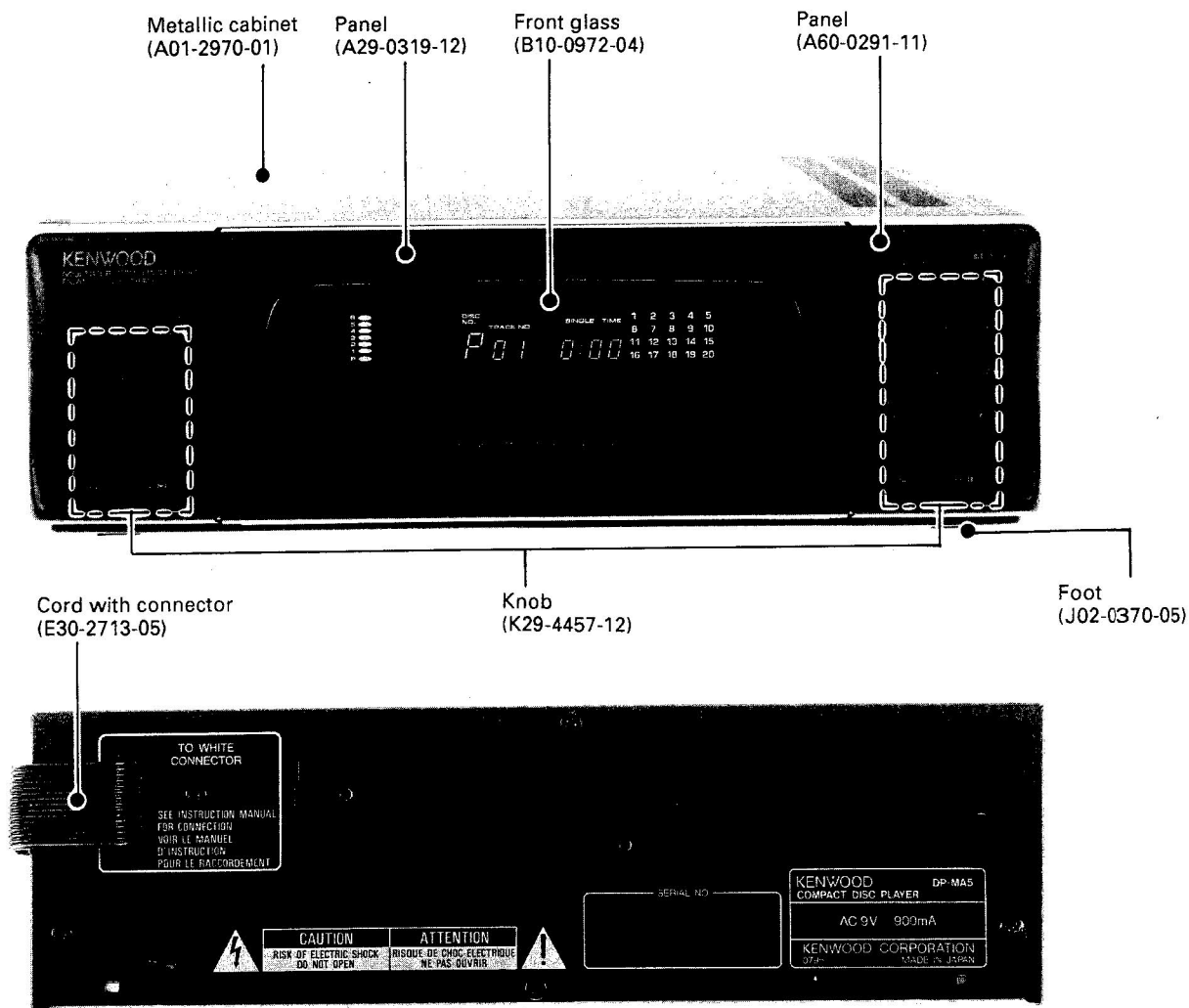
COMPACT DISC PLAYER

# DP-MA5/MA9

## SERVICE MANUAL

# KENWOOD

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\*Photo is DP-MA5.

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**DANGER:** Laser radiation when open and interlock defeated.  
**AVOID DIRECT EXPOSURE TO BEAM.**

**CAUTION:** When doing repair of DP-MA5, MA9 be sure to have the customer bring the A-A5/L, A-A7/L, C-A9/L or use power supply jig RM-90PS, or supply to 9V AC to terminal Nos 12 and 13 of CN11 on the X32-2280 PC board ass'y. If not get 9V AC, please order the A-848's power transformer (parts No. L07-0038-05 / 120V / 220V / 240V). Refer to the DP-911 service manual. Don't use the "RHEOSTAT".

# DP-MA5/MA9

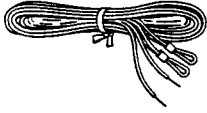
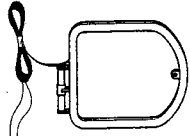
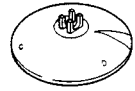
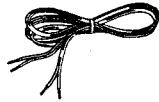
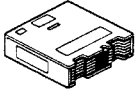
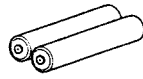
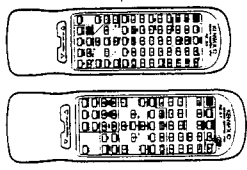
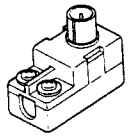
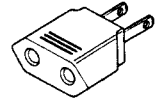
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### ACCESSORIES

- |   |  |   |
|---|--|---|
| <ul style="list-style-type: none"> <li>• FM indoor antenna ..... 1<br/>(T90-0176-05)</li> </ul>   | <ul style="list-style-type: none"> <li>• AM loop antenna ..... 1<br/>(T90-0173-05)</li> </ul>    | <ul style="list-style-type: none"> <li>• Loop antenna stand ..... 1<br/>(J19-2815-04)</li> </ul>    |
| <ul style="list-style-type: none"> <li>• Speaker cords* ..... 2<br/>*Refer to speaker's service manual.</li> </ul>                                 | <ul style="list-style-type: none"> <li>• Magazine (with 6 disc trays) ..... 1<br/>(J19-3394-13)</li> </ul>    | <ul style="list-style-type: none"> <li>• Battery ("AAA" or "R03") ..... 2<br/>(-)</li> </ul>   |
| <ul style="list-style-type: none"> <li>• Remote control unit ..... 1<br/>(X94-1000-71 : RC-A5) DP-MA5<br/>(X94-1000-61 : RC-A7) DP-MA9</li> </ul>  | <ul style="list-style-type: none"> <li>• Antenna adaptor (75<math>\Omega</math>/300<math>\Omega</math>) ..... 1<br/>(T90-0185-05) : For U.K. and Europe</li> </ul>  | <ul style="list-style-type: none"> <li>• AC plug adapter (M type only) ..... 1<br/>(E03-0115-05 : Except for some areas)</li> </ul>  <p>For the unit with a European AC plug in areas other than Europe.</p> |

Speaker cords are packed with the speakers. Remote control unit is packed with the graphic equalizer unit. Magazine is packed with the CD player. All other accessories are packed with the receiver unit.

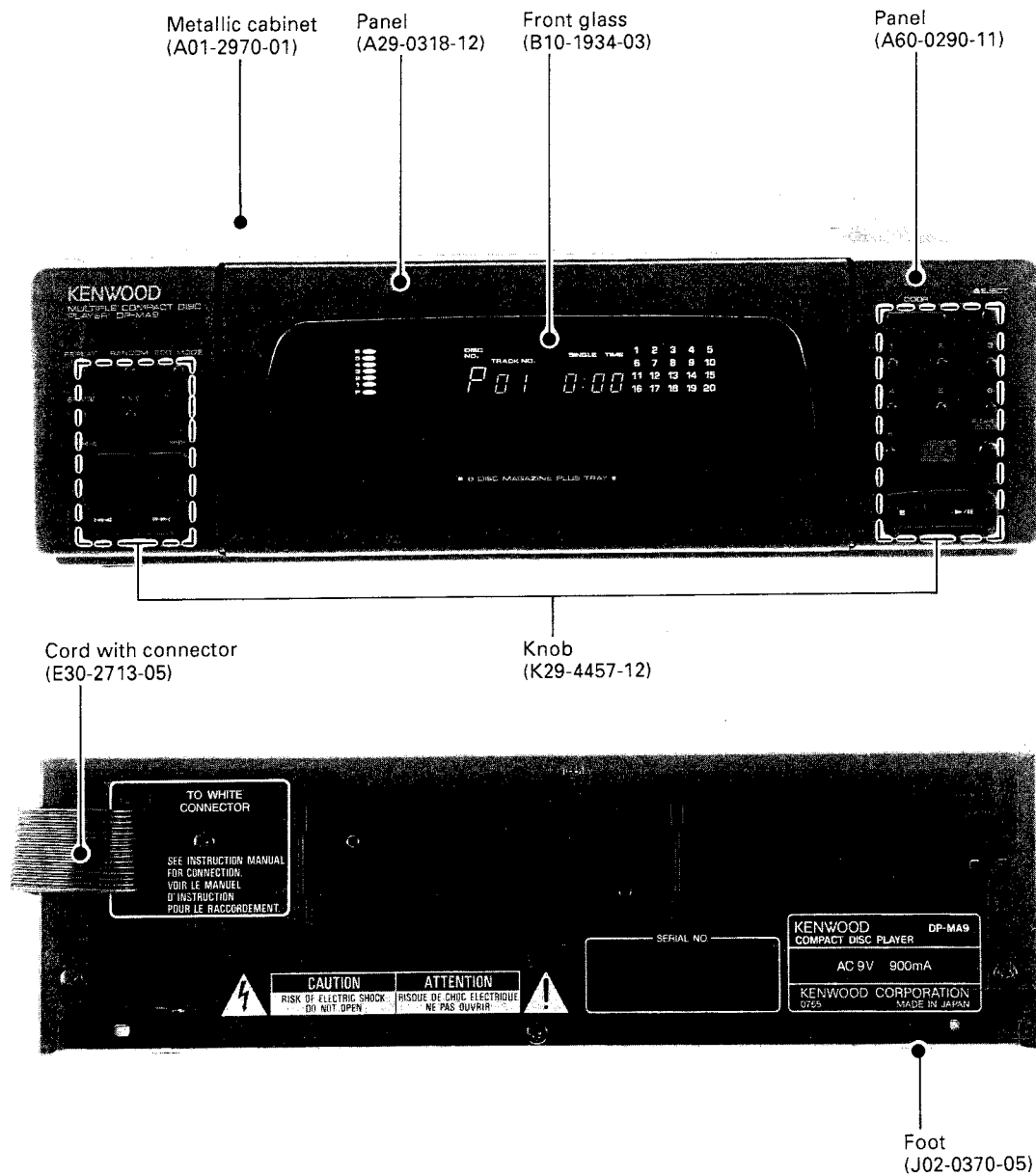
System name	Pre-amp	Main amp	Receiver	Graphic equalizer	CD player	Cassette deck	Speaker
UD-900M	C-A9/L	B-A9	-	-	DP-MA9	X-A9	LS-A9
UD-700M	-	-	A-A7/L	GE-A7	DP-MA9	X-A9	LS-A6
UD-500M	-	-	A-A5/L	GE-A5	DP-MA5	X-A5	LS-A5

System name	Outer packing case
UD-900M	H60-0108-04 : M, P, X
	H60-0109-04 : E
	H60-0110-04 : K
UD-500M	H60-0104-04 : P, M, X, Y
	H60-0105-04 : E

System name	Outer packing case
UD-500M	H60-0106-04 : K
UD-700M	H60-0101-04 : M, X, P
	H60-0102-04 : E
	H60-0100-04 : K

# DP-MA5/MA9

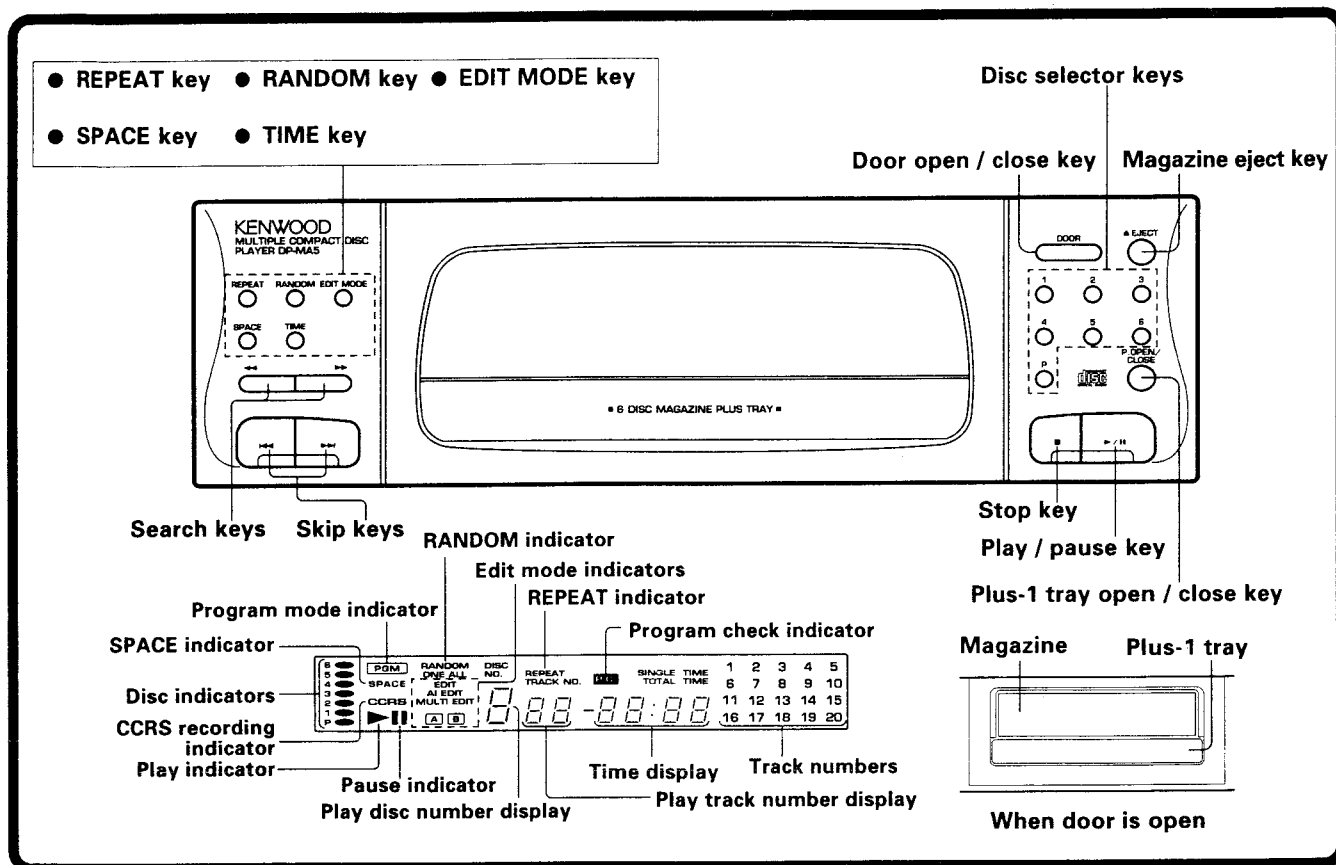
## EXTERNAL VIEW : DP-MA9



**\*Photo is DP-MA9.**

# DP-MA5/MA9

## CONTROL



### • Note related to transportation and movement (CD player)

Before transporting or moving this unit, carry out the following operations.

1. Turn the power ON but do not load a disc.
2. Wait a few seconds and verify that the display shown appears.
3. Turn the power OFF.
4. Set the transportation hardware to the rear panel (exploded view No. 640).

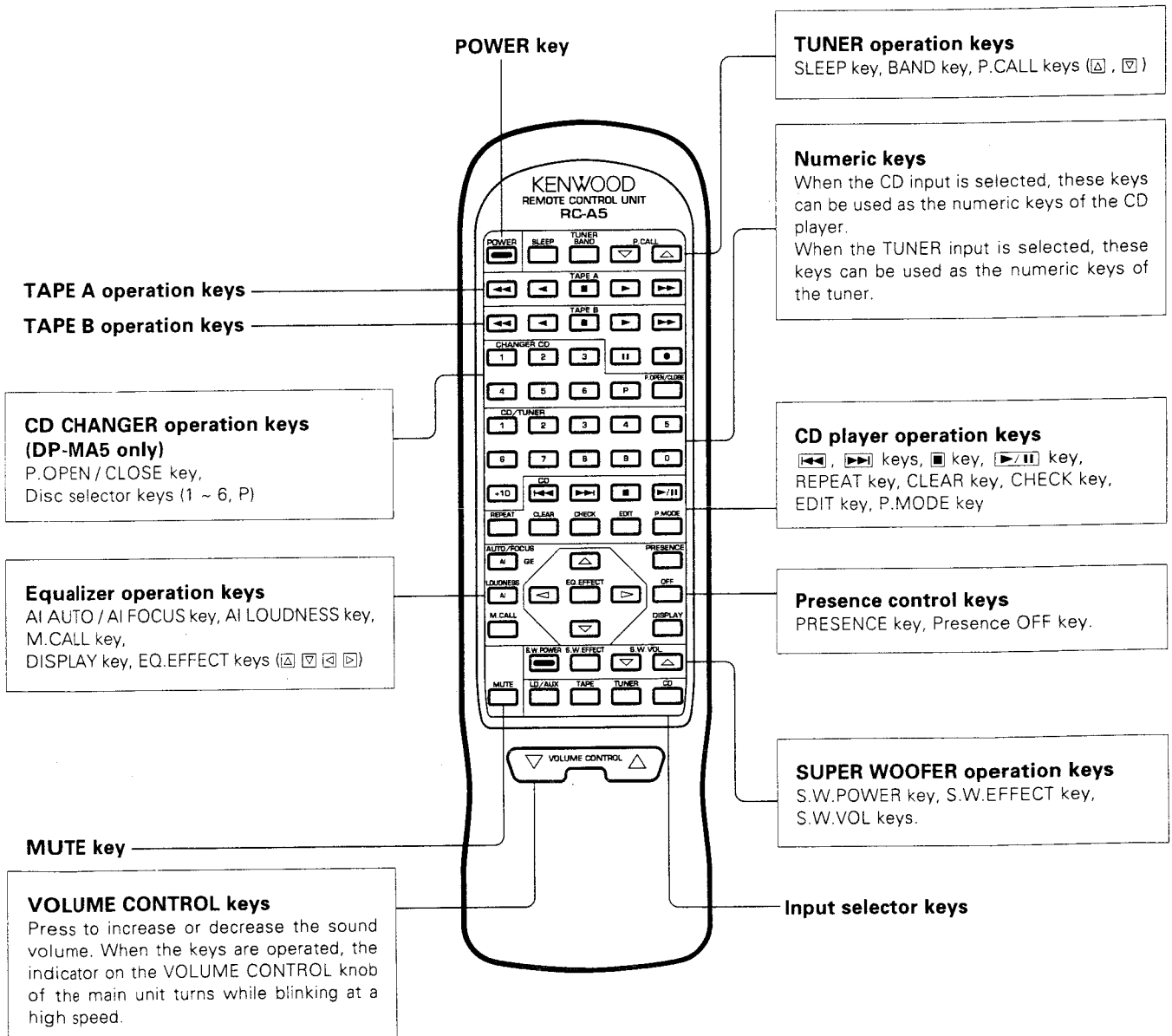
Without magazine, press the key.

DISC NO.	TRACK NO.	SINGLE TIME	1	2	3	4	5
1	00	00	6	7	8	9	10
2			11	12	13	14	15
3			16	17	18	19	20

# DP-MA5/MA9

## REMOTE CONTROL OPERATION

Model : RC-A5 (DP-MA5)



# DP-MA5/MA9

## REMOTE CONTROL OPERATION

Model : RC-A7 (DP-MA9)

### SUPER WOOFER operation keys

To operate the super woofer speaker, set the A/B switch to the A position.  
S.W.POWER key, S.W.EFFECT key, S.W.VOL keys.

POWER key

### Cassette deck operation keys

To operate deck A, set the A/B switch to the A position. (The and keys are invalid in this position.)  
To operate deck B, set the A/B switch to the B position.

### Numeric keys

When the CD input is selected, these keys can be used as the numeric keys of the CD player.  
When the TUNER input is selected, these keys can be used as the numeric keys of the tuner.

### Presence control keys

ASFC keys, REAR LEVEL keys, DELAY TIME keys.

Input select keys

### VOLUME CONTROL keys

Press to increase or decrease the sound volume. When the keys are operated, the indicator on the VOLUME CONTROL knob of the main unit turns while blinking at a high speed.

### Remote control function A / B selector switch

The keys in the sections marked with can be used in two ways according to the position of this switch.

- When the function of a key is described in white and brown characters, the brown function is usable in the A position and the white function is usable in the B position.
- Other keys are usable regardless of the A or B position of this switch.

### TUNER operation keys

To operate the tuner, set the A/B switch to the B position.  
SLEEP key, BAND key, P.CALL key.

### CD player operation keys

keys, key, key, CLEAR key, CHECK key, EDIT key, P.MODE key.  
When A/B switch is in the A position:  
P.OPEN/CLOSE key (for CD player equipped with CD disc changer).  
When A/B switch is in the B position:  
REPEAT key

### CD changer (DP-MA9) operation keys

To operate the changer-equipped CD player, set the A/B switch to the A position.

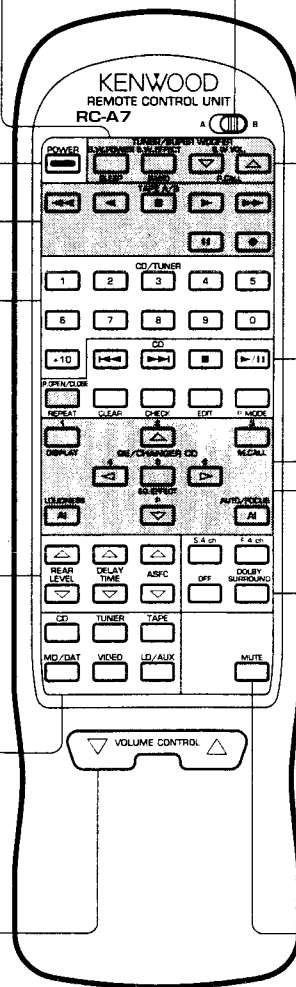
### Equalizer operation keys

To operate the equalizer, set the A/B switch to the B position.  
AI AUTO / AI FOCUS key, AI LOUDNESS key, M.CALL (Memory Call) key, DISPLAY key, EQ.EFFECT keys (, , , )

### Presence effect keys

S.4ch key, F.4ch key, DOLBY SURROUND key, Presence OFF key.

MUTE key



# DP-MA5/MA9

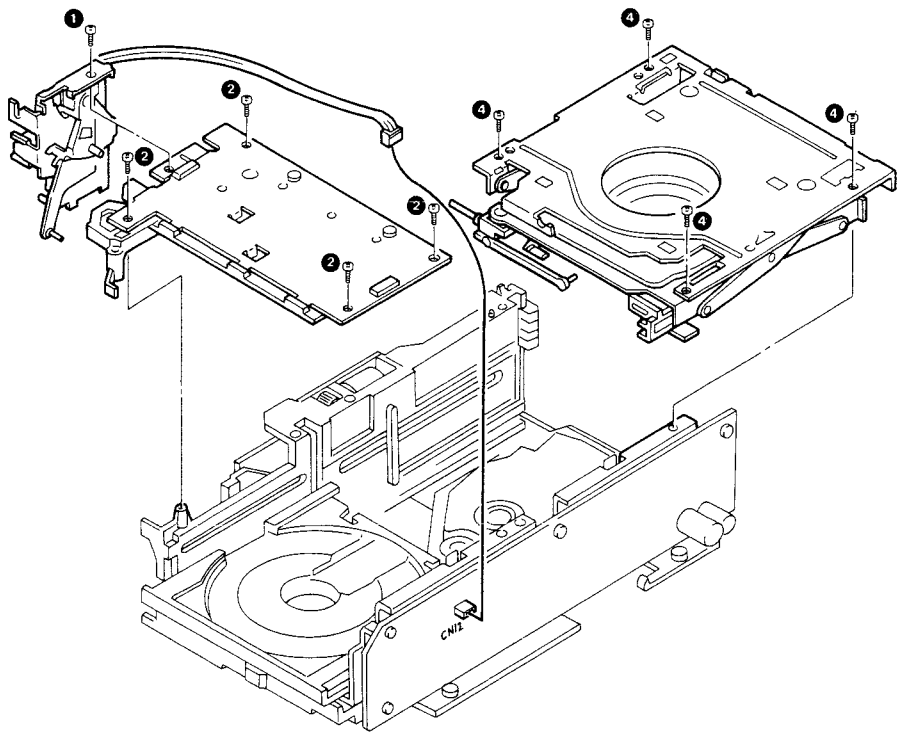
## DISASSEMBLY FOR REPAIR

### 1. How to Disassemble MD (Mechanism

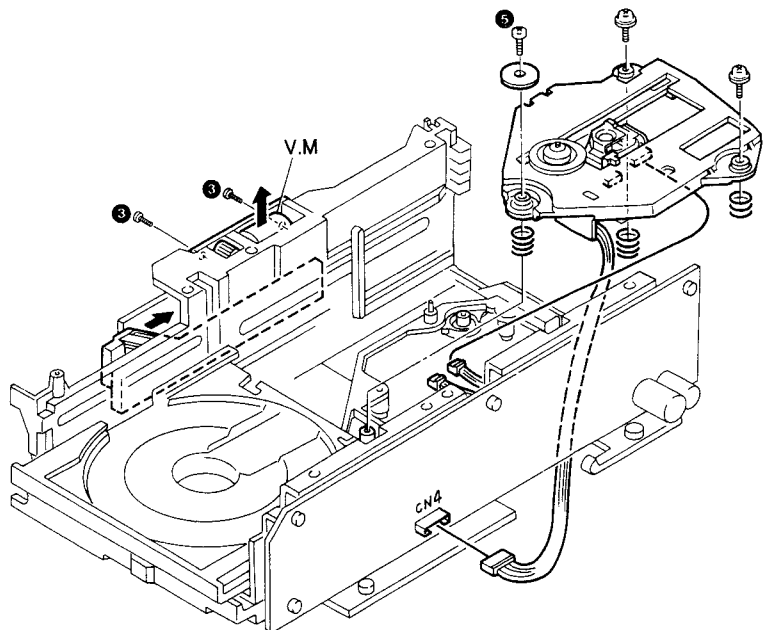
#### Deck) ass'y

##### \* Take out Magazine pack.

1. Remove solenoid ass'y ( ❶ ).
2. Remove magazine lock ass'y ( ❷ ).



3. Remove screws of vertical motor ( ❸ ).
4. Lift up motor and move slider fully backwards.
5. Remount vertical motor with screws.
6. Remove lifter ass'y ( ❹ ).
7. Remove screws of MD ass'y ( ❺ ).

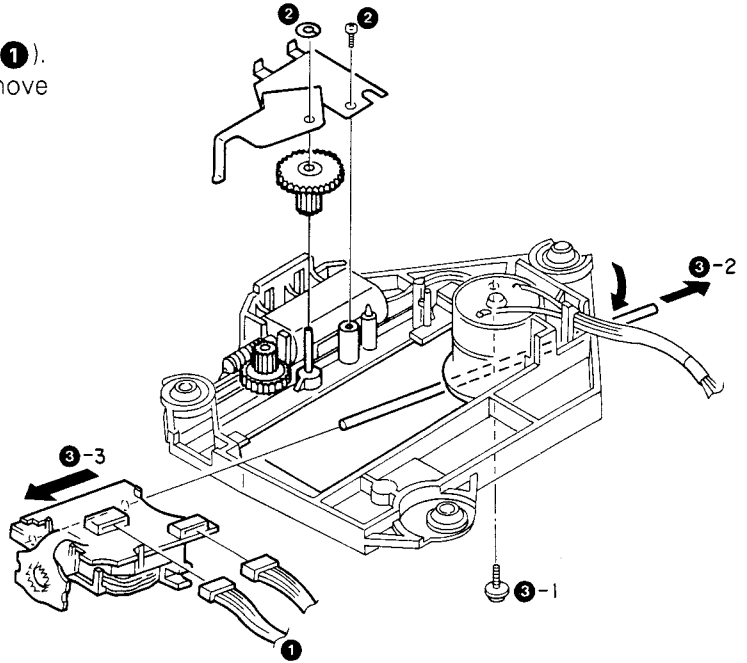


# DP-MA5/MA9

## DISASSEMBLY FOR REPAIR

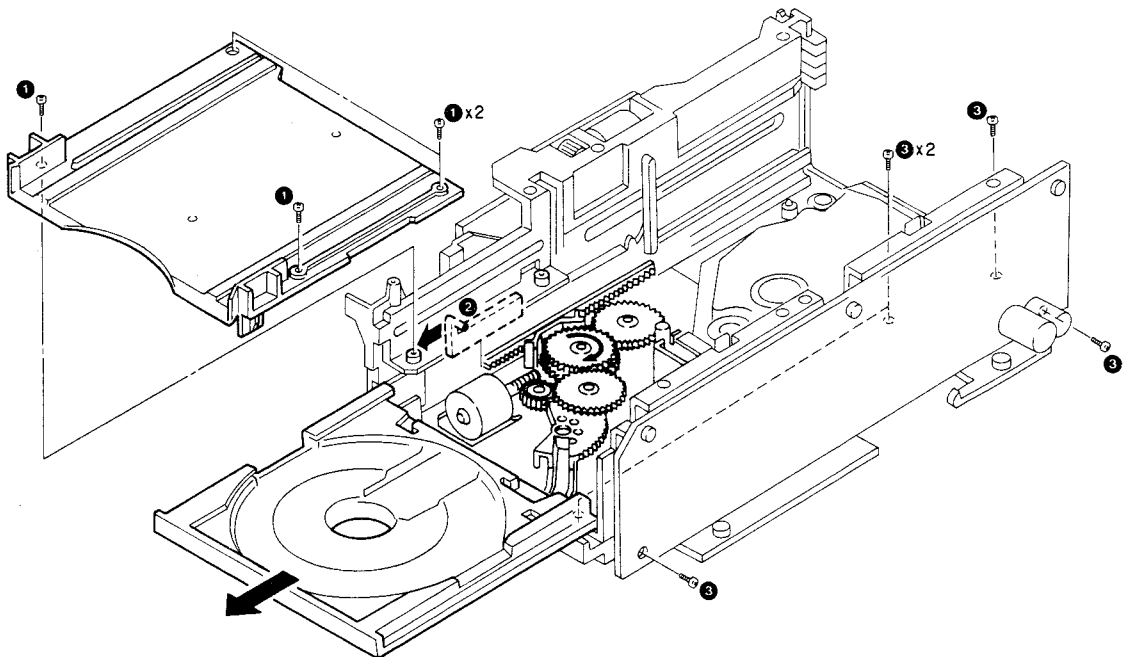
### 2. How to Replace the Pickup

1. Remove MD ass'y and connector for pickup (1).
2. Remove washer and screw (2). And remove feed gear.
3. Remove screw for pickup rod (3-1).
4. Pull out rod (3-2) and remove pickup (3-3).



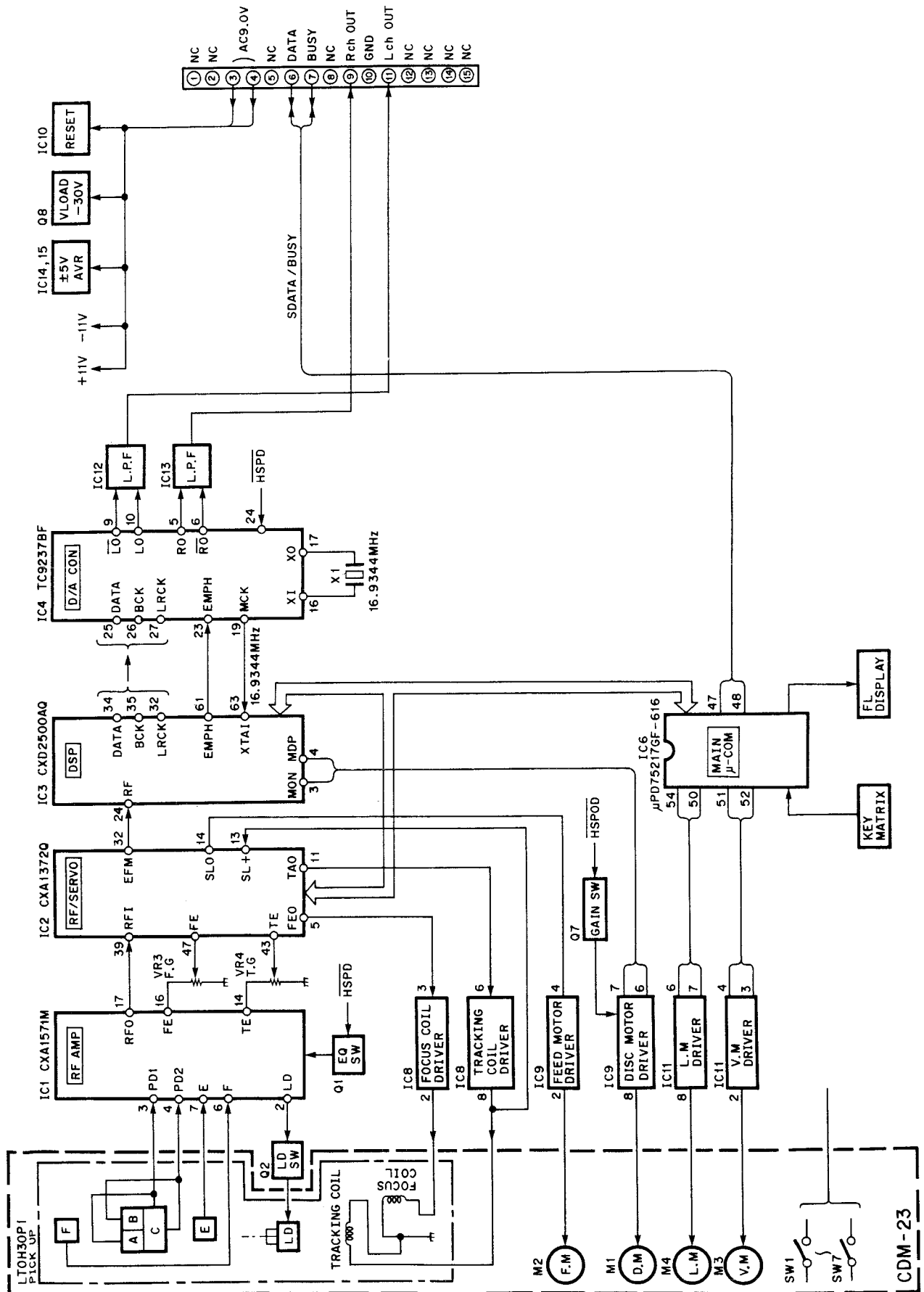
### 3. How to Remove Plus 1 Tray ass'y

1. Unscrew screws (1) and remove magazine pack holder.
2. Move lock lever (2) frontwards and pull out plus 1 tray frontwards. If not come out tray, turn gear clockwise.
3. Remove screws (3).





## BLOCK DIAGRAM



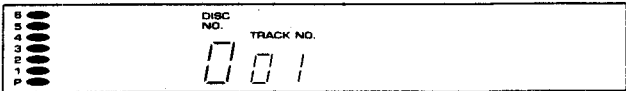
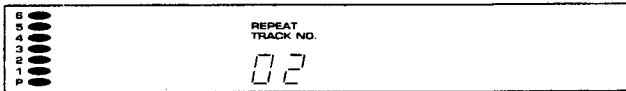
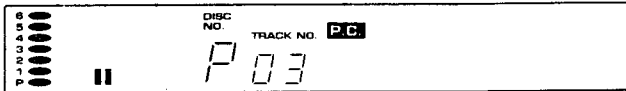
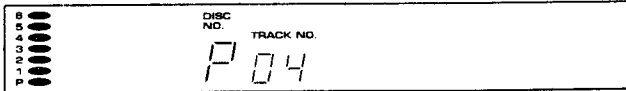
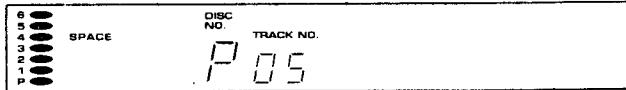
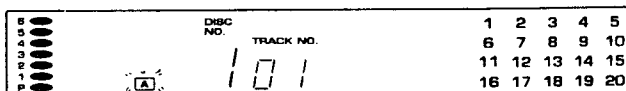
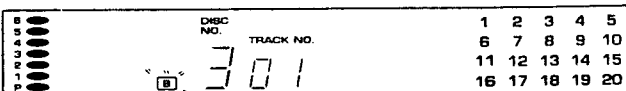
# DP-MA5/MA9

## CIRCUIT DESCRIPTION

### 1. Test Mode

#### 1-1. Setting the test mode

This microprocessor built in this unit (X32-) can be put to TEST MODE by just short-circuiting the test pins (#2 and #3).

No.	Input key	Function	Display
1	STOP	(1) Focusing servo ..... OFF (2) Tracking servo ..... OFF (3) Feed servo ..... OFF	
2	REPEAT	(1) Laser (In STOP mode only) ..... ON	
3	RANDOM	(1) Focusing servo ..... ON (2) Tracking servo ..... OFF (3) Feed servo ..... OFF	
4	TIME	(1) Focusing servo ..... ON (2) Tracking servo ..... ON (3) Feed servo ..... OFF	
5	PLAY	(1) Focusing servo ..... ON (2) Tracking servo ..... ON (3) Feed servo ..... ON	
6	DISC 1	Load No.1 disc to No.6 in order.	
7	DISC 2	Read the TOC (table of contents) of disc No.3 to No.6 in order. TEST mode is cancelled after reading the TOC of No.6 disc, and then playback the 1st track.	

# DP-MA5/MA9

## CIRCUIT DESCRIPTION

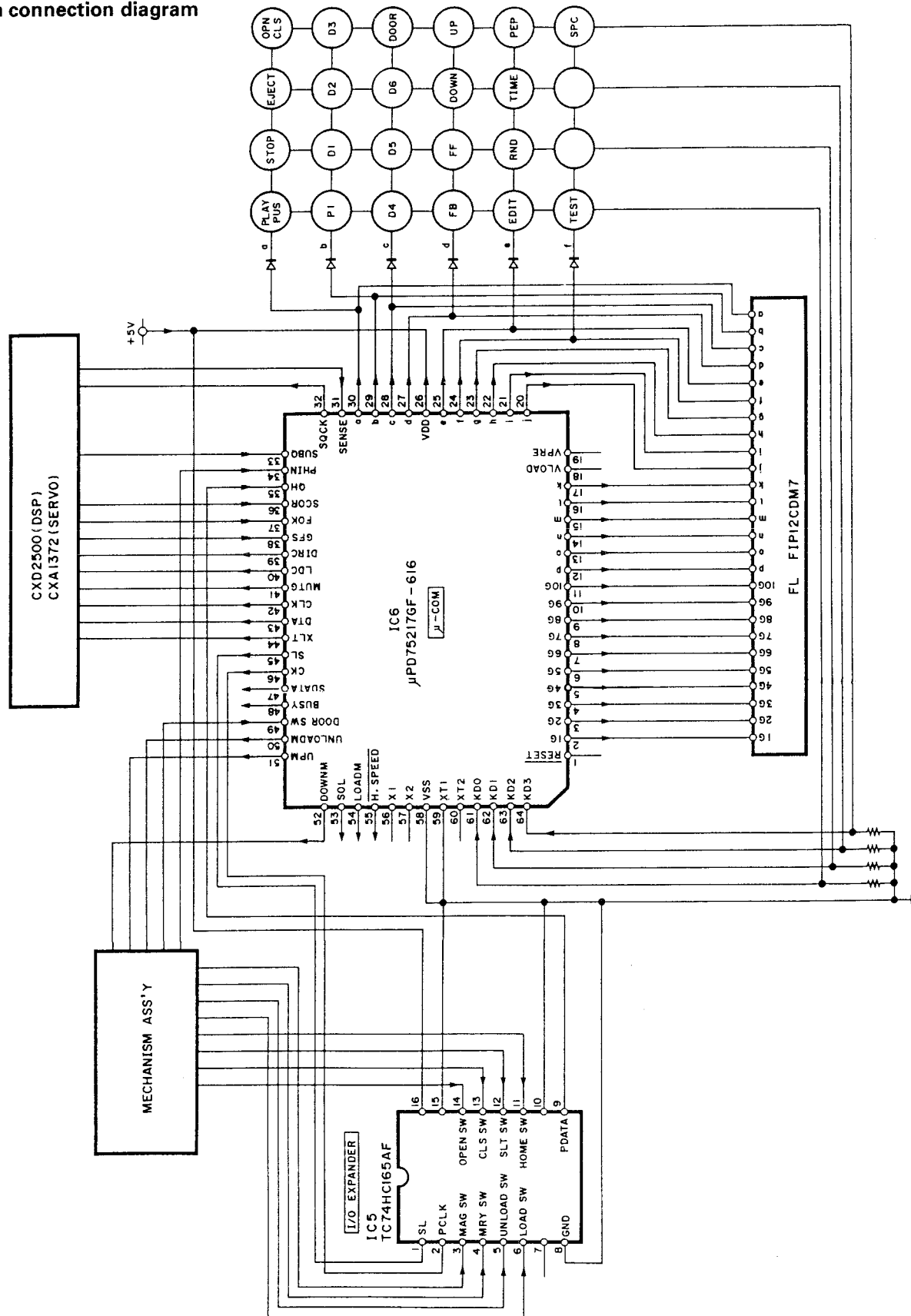
No.	Input key	Function	Display
8	DISC P	Load the decided No. disc which is pressed by the key and set to STOP mode. ex. Disc No.4 key is pressed (PLAY, CHECK and CLEAR keys are available to operat).	
9	UP	Turns all FL display lamps ON.	
10	DOWN	Turns all FL display lamps OFF. "DISC" and "1 ~ 6" are not off because circuit is static operation.	
11	EDIT	(1) Door opens. (2) P1 tray come out. Press "EDIT" key, "PLAY MODE".	
12	FF	In the STOP mode, moves the pickup slightly toward the outer position of disc.	
13	FB	In the STOP mode, moves the pickup slightly toward the inner position of disc.	
14	SPACE	High-speed playback CHECK mode (in stop mode only) playback P1 disc in high-speed mode. If press "SPACE" key, change to normal mode. In this mode, all keys are available.	

# DP-MA5/MA9

## CIRCUIT DESCRIPTION

### 2. Microprocessor : $\mu$ PD75217GF-616 (IC6)

#### 2-1. Pin connection diagram



## CIRCUIT DESCRIPTION

### 2-3. Pin functions : $\mu$ PD75217GF-616

Pin No.	Pin name	I/O	Function
1	RESET	–	Reset input port
2~11	1G~10G	O	FL segment control port
12~17	p~k	O	FL segment control port (key-scan)
18	VLOAD	O	FL driver negative power supply
19	VPRE	O	FL pre-driver power supply
20~25	j~e	O	FL segment control port also used for key-scan
26	V <sub>DD</sub>	–	Power supply (+5V)
27~30	d~a	O	FL segment control port also used for key-scan
31	SENSE	I	Signal detection port for SENSE signal from signal processor and servo IC
32	SQCK	O	Q-data read clock output port
33	SUBQ	I	Q-data input port
34	PHIN	I	Photo interrupter input port for mechanism
35	QH	I	Data input from TC74H165
36	SCOR	I	Sub-code frame sync detection signal input port
37	FOK	I	Input port of FOK signal from RF amp
38	GFS	I	Input port of frame sync signal
39	DIRC	O	DIRC control port of servo IC
40	LDC	O	Laser ON/OFF signal output
41	MUTG	O	Mute port of signal processor
42	CLK	O	Signal processor and servo IC control out port (CLOCK)
43	DATA	O	Signal processor and servo IC control out port (DATA)
44	XLT	O	Signal processor and servo IC control out port (LATCH)
45	S/L	O	Latch output port of TC74HC165
46	CK	O	Clock output port of TC74HC165
47	SDATA	I/O	Serial DATA I/O port
48	BUSY	I/O	Serial BUSY I/O port
49	DOORSW	I	Door switch input port of mechanism
50	UNLOADM	O	Control port of unloading motor for mechanism
51	UPM	O	Control port of UP motor for mechanism
52	DOWNM	O	Control port of DOWN motor for mechanism
53	SOL	O	Control port of solenoid for mechanism
54	LOADM	O	Control port of loading motor for mechanism
55	H.SPEED	O	High-speed control port (Active L)
56	X1	–	Oscillation input port (4.19MHz)
57	X2	–	Not used
58	V <sub>SS</sub>	–	GND
59	XT1	–	GND
60	XT2	–	GND
61~64	KD0~3	I	Key input port

### 2-3. I/O Expander : TC74HC165AF (IC5)

#### Pin functions

Pin No.	Pin name	I/O	Function
1	SL	I	Shift load input
2	PCLK	I	Clock input
3	MAGSW	I	Magazine switch (S4)
4	MRYSW	I	Memory switch (S3)
5	UNLOADSW	I	Unload switch (S2)
6	LOADSW	I	Load switch
7	–	O	No use
8	GND	–	Ground
9	PDATA	O	Data output
10	–	I	No use
11	HOMESW	I	Home position switch (S1)
12	SLTSW	I	Start limit switch (S8)
13	CLSSW	I	Tray close switch (S6)
14	OPNSW	I	Tray open switch (S7)
15	–	I	No use
16	V <sub>CC</sub>	–	Power supply (+5V)

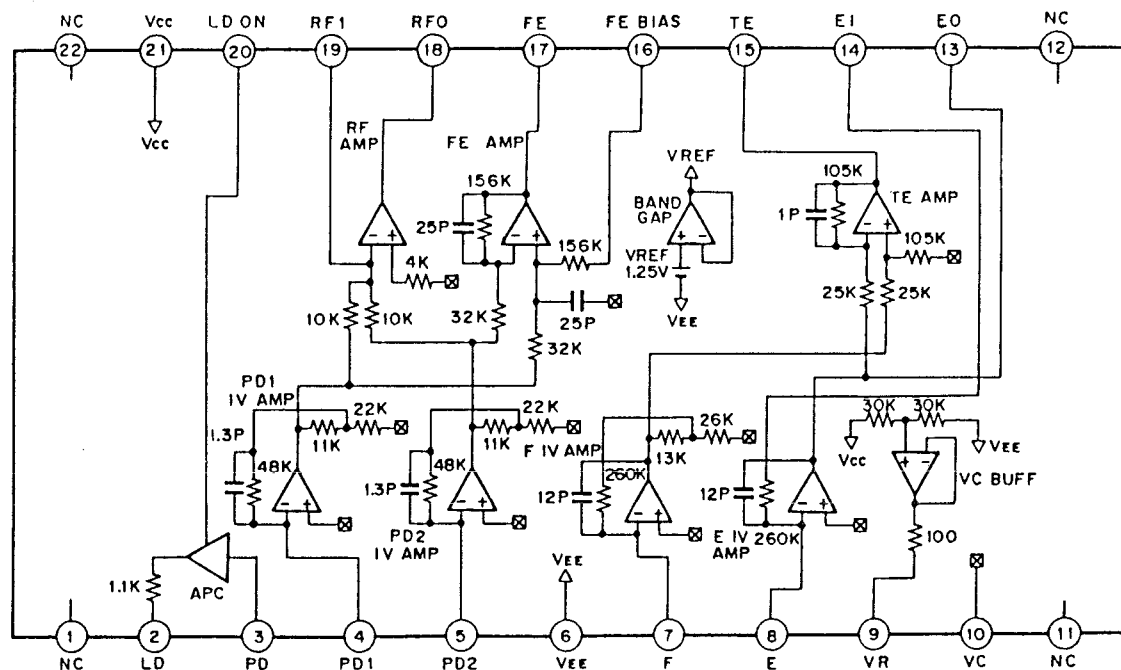
# DP-MA5/MA9

## CIRCUIT DESCRIPTION

### 3. RF amplifier : CXA1571M (IC1)

CXA1571M is an IC developed for compact disc players. It contains an RF amplifier for 3 spot optical pickup, focus error amplifier, tracking error amplifier, and APC circuit.

#### 3-1. Block diagram



#### 3-2. Pin functions

Pin No.	Pin name	I/O	Function
2	LD	O	APC LD amplifier output pin.
3	PD	I	APC LD amplifier input pin.
4	PD1	I	RF I-V amplifier inverted input pin. Current input by connecting to the photo diode A+C terminals.
5	PD1	I	RF I-V amplifier inverted input pin. Current input by connecting to the photo diode B+D terminals.
7	F	I	F I-V amplifier inverted input pin. Current input by connecting to the photo diode F terminal.
8	E	I	E I-V amplifier inverted input pin. Current input by connecting to the photo diode E terminal.
9	VR	O	CD voltage output pin of $(V_{CC}+V_{EE}) / 2$ .
10	VC	I	Connected GND when using dual power supply ( $\pm$ ). Connected to VR (pin 9) when using a single power supply.
13	EO	O	E output of I-V amplifier.
14	EI	-	E I-V amplifier feedback input pin. For E I-V amplifier gain adjustment.
15	TE	O	Tracking error amplifier output pin.
16	FE-BIAS	I	Bias pin on the focus error amplifier non-inverted side.
17	FE	O	Focus error amplifier output pin.
18	RFO	O	RF summing amplifier output pin.
19	RFI	I	Inverted input pin of RF amplifier. Gain of amplifier is fixed by resistor between RFO and RFI.
20	LD-ON	I	LD ON / OFF select pin. ( $V_{CC}$ : ON)

# DP-MA5/MA9

#### 4. Servo Signal Processor : CXA1372Q (IC2)

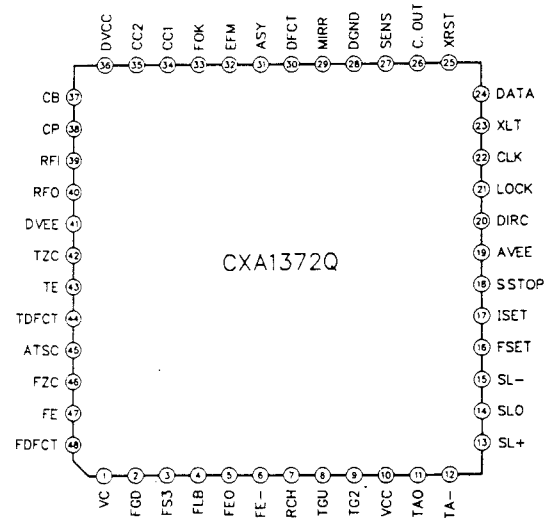
## Outline

CXA1372Q is a bipolar IC developed to be used for processing of the RF signal (Focus OK, mirror, defect, comparator of EFM) and servo control.

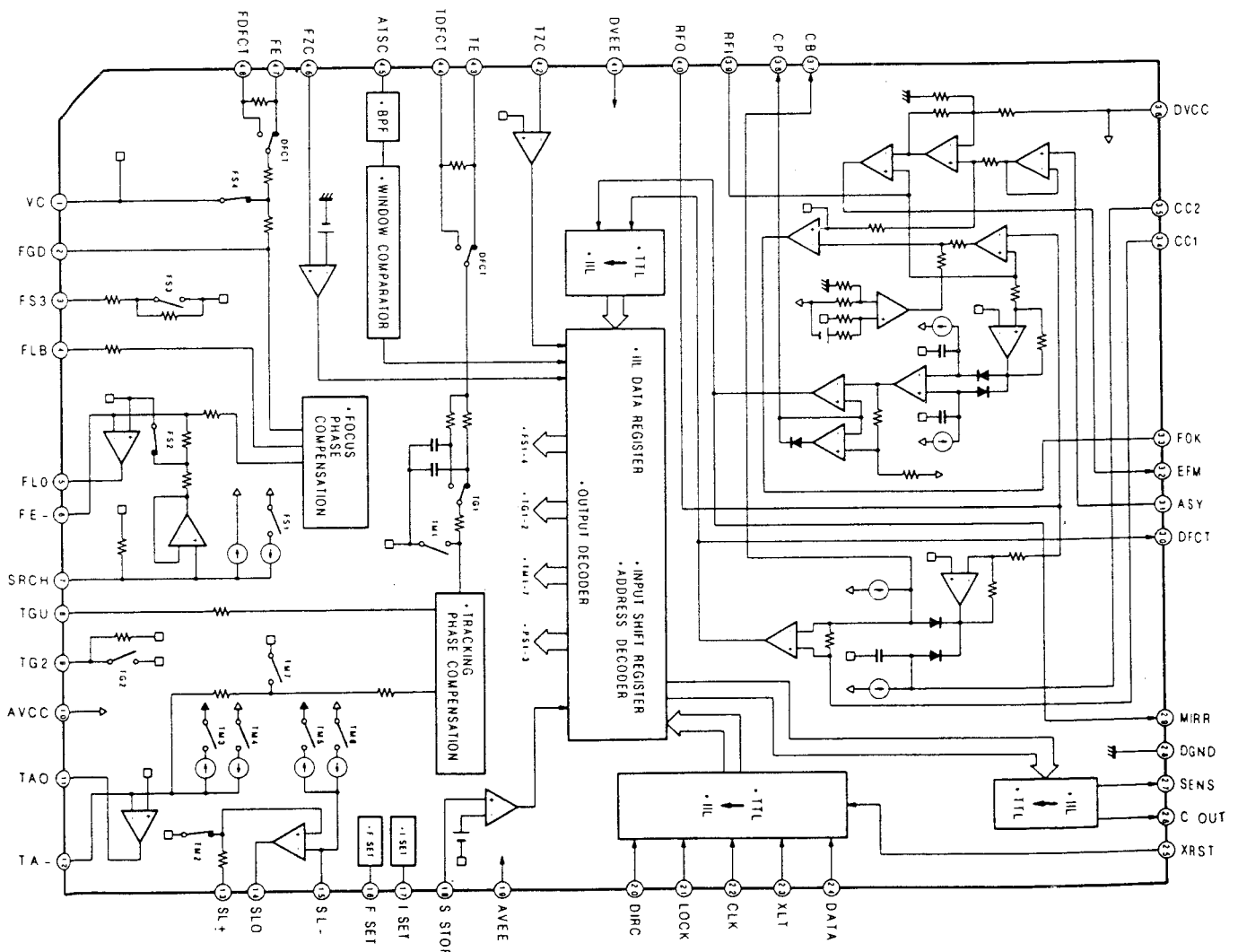
## Functions

- Auto asymmetry control
- Focus OK detection circuit
- Mirror detection circuit
- Defect detection and countermeasure circuit
- EFM comparator
- Focus servo control
- Tracking servo control
- Thread servo control

#### 4-1. Pin connection



#### 4-2. Block diagram



# DP-MA5/MA9

## CIRCUIT DESCRIPTION

### 4-3. Pin functions

Pin No.	Pin name	I/O	Function
1	VC	I	Middle-point voltage input terminal. When two power sources are used : GND, when single power source is used : (Vcc+GND)/2.
2	FGD	I	When lowering the high-band gain of the focus servo, insert a capacitor between this terminal and terminal No. 3.
3	FS3	I	Change the high-band gain of the focus servo by turning FS3 on and off.
4	FLB	I	Outside terminal of time constant for raising the low-band of the focus servo.
5	FEO	O	Focus drive output.
6	FE-	I	Inverted input terminal of focus amplifier.
7	SRCH	I	Outside terminal of time constant for making focus search waveform.
8	TGU	I	Outside terminal of time constant for changing high-band gain of tracking.
9	TG2	I	Outside terminal of time constant for changing high-band gain of tracking.
10	AVCC		
11	TAO	O	Tracking drive output.
12	TA-	I	Inverted input terminal of tracking amplifier.
13	SL+	I	Non-inverted input terminal of thread amplifier.
14	SLO	O	Thread drive output.
15	SL-	I	Inverted input terminal of thread amplifier.
16	FSET	I	Terminal for setting the peak for phase compensation of focus tracking.
17	ISET	I	Current for determining the height of the focus search track jump thread kick is applied.
18	SSTOP	I	Terminal for ON/OFF detecting signal of limit switch for detecting the most inside line of disc.
19	AVEE		
20	DIRC	I	Used to jump over one track. 47kΩ pull-up resistor is inserted.
21	LOCK	I	When "L", thread runaway-preventive circuit operates. 47kΩ pull-up resistor is inserted.
22	CLK	I	Clock input for transferring the serial data from CPU (having no pull-up resistors).
23	XLT	I	Latch input from CPU (having no pull-up resistors).
24	DATA	I	Serial data input from CPU (having no pull-up resistors).
25	XRST	I	Reset when reset input terminal is at "L" (having no pull-up resistors).
26	SENS	O	Outputs FZC, AS, TZC, SSTOP, etc. on receipt of command from CPU.
27	C. OUT	O	Signal output for counting tracks.
28	DGND		
29	MIRR	O	Output terminal of MIRR comparator. (DC voltage : Load of 10kΩ connected)
30	DFCT	O	Output terminal of DEFECT comparator. (DC voltage : Load 10kΩ connected)
31	ASY	I	Input terminal of auto asymmetry control.
32	EFM	O	Output terminal of EFM comparator. (DC voltage : Load of 10kΩ connected)
33	FOK	O	Output terminal of focus OK comparator. (DC voltage : Load of 10kΩ connected)
34	CC1	I	DEFECT bottom hold output terminal.
35	CC2	O	Terminal in which DEFECT bottom hold output is input after capacitive coupling.
36	DVCC		
37	CB	I	Terminal to which DEFECT bottom hold capacitor is connected.
38	CP	I	Terminal for connecting MIRR hold comparator. Non-inverted input terminal of MIRR comparator.
39	RFI	I	Terminal in which output of RF summing amplifier is input after capacitive coupling.
40	RFO	O	Output terminal of RF summing amplifier. Check point of eye pattern.
41	DVEE		
42	TZC	I	Input terminal of tracking zero cross comparator.
43	TE	I	Input terminal of tracking error.
44	TDFCT	I	Terminal for connecting the capacitor for time constant in case of defect.
45	ATSC	I	Input terminal of window comparator for detecting ATSC.
46	FZC	I	Terminal for inputting the focus zero cross comparator.
47	FE	I	Input terminal of focus error.
48	PDFCT	I	Terminal for connecting capacitor for time constant in case of defect.



## CIRCUIT DESCRIPTION

### 5. Digital Signal Processor : CXD2500AQ (IC3)

#### Outline

The CXD2500AQ is a digital signal processing LSI for a compact disc player, which has the following functions.

- A wide frame jitter margin realized by 32-KRAM ( $\pm 28$  frames)
- Bit clocks for strobing EFM signal are generated by the digital PLL, and the capture range is  $\pm 150$ kHz minimum
- Demodulation of EFM data
- Protection and reinforcement of EFM frame sync signal
- Strong error correction by refined super strategy. C1 : Double correction, C2 : Quadruple correction
- Double-speed replay and variable pitch replay
- Reduction of noise generation at track jumps
- Auto zero cross muting
- Demodulation of sub-code and detection of errors in sub-code Q data

- Digital spindle servo (Having over-sampling filter)
- 16-bit traverse counter
- CPU interface by serial bus
- A built-in servo auto sequencer
- Output for digital audio interface
- Built-in digital level meter and peak meter
- Applicable to bilingual system

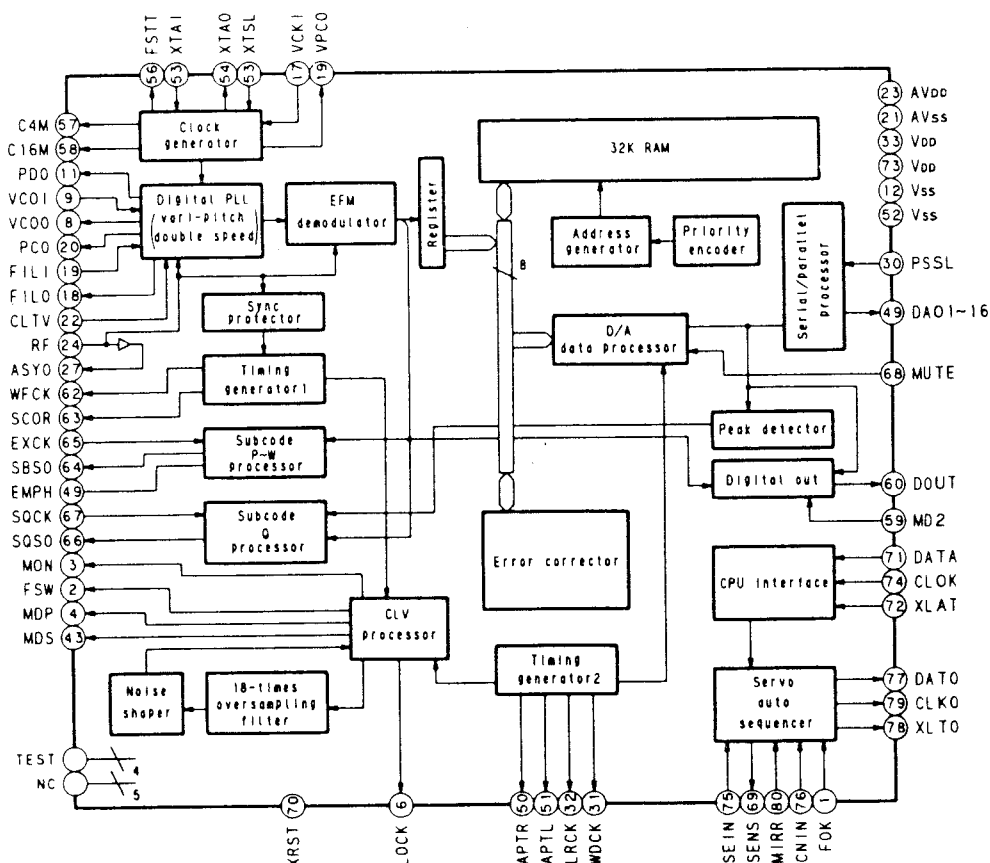
#### Features

- One chip of this LSI can process all the digital signals used for replay
- Integration level can be heightened because of the built-in RAM

#### Structure

Silicon gate CMOS

#### 5-1. Block diagram



# DP-MA5/MA9

## CIRCUIT DESCRIPTION

### 5-2. Pin functions

Pin No.	Pin name	I/O	Function
1	FOK	I	Focus OK input terminal. Used for SENS output and servo auto sequencer.
2	FSW	O	Output for changing output filter of spindle motor.
3	MON	O	ON/OFF control output of spindle motor.
4	MDP	O	Servo control of spindle motor.
5	MDS	O	Servo control of spindle motor.
6	LOCK	O	Outputs "H", when GFS is sampled at 460Hz and it is "H". Output "L", if "L" is detected eight times continuously.
7	NC	-	Not used.
8	VCOO	O	Oscillation circuit output for analog EFM PLL.
9	VCOI	I	Oscillation circuit input for analog EFM PLL. $f_{lock} = 8.6436\text{MHz}$
10	TEST	I	Test terminal, normally grounded.
11	PDO	O	Charge pump output for analog EFM PLL.
12	Vss	-	GND.
13~15	NC	-	Not used.
16	VPCO	O	PLL charge pump output for variable pitch.
17	VCKI	I	Clock input $f_{center} = 16.9344\text{MHz}$ from outside VCO for variable pitch.
18	FILO	O	Filter output for master PLL (Slave = Digital PLL).
19	FILI	I	Filter input for master PLL.
20	PCO	O	Charge pump output for master PLL.
21	AVss	-	Analog GND.
22	CLTV	I	VCO control voltage input for master.
23	AVdd	-	Analog power source (+5V).
24	RF	I	EFM signal input.
25	TEST2	I	Used for grounding.
26	TEST3	I	Used for grounding.
27	ASYO	O	EFM full swing output ("L" = Vss, "H" = Vdd).
28	TEST4	I	Used for grounding.
29	NC	-	Not used.
30	PSSL	I	Audio data output mode changing input. Set to "L" for serial output and "H" for parallel output.
31	WDCK	O	D/A interface for 48-bit slot. Word clock $f = 2 F_s$
32	LRCK	O	D/A interface for 48-bit slot. LR clock $f = F_s$
33	Vdd	-	Source voltage (+5V).
34	DA16	O	Outputs DA16 (MSB) when PSSL = 1. Outputs serial data of 48-bit slot when PSSL = 0. (2s' COMP, MSB first)
35	DA15	O	Outputs DA15 when PSSL = 1. Outputs bit clock of 48-bit slot when PSSL = 0.
36	DA14	O	Outputs DA14 when PSSL = 1. Outputs serial data of 64-bit slot when PSSL = 0. (2s' COMP, LSB first)
37	DA13	O	Outputs DA13 when PSSL = 1. Outputs bit clock of 64-bit slot when PSSL = 0.
38	DA12	O	Outputs DA12 when PSSL = 1. Outputs LR clock of 64-bit slot when PSSL = 0.
39	DA11	O	Outputs DA11 when PSSL = 1. Outputs GTOF when PSSL = 0.
40	DA10	O	Outputs DA10 when PSSL = 1. Outputs XUGF when PSSL = 0.
41	DA09	O	Outputs DA09 when PSSL = 1. Outputs XPLCK when PSSL = 0.
42	DA08	O	Outputs DA08 when PSSL = 1. Outputs GFS when PSSL = 0.
43	DA07	O	Outputs DA07 when PSSL = 1. Outputs RFCK when PSSL = 0.
44	DA06	O	Outputs DA06 when PSSL = 1. Outputs C2P0 when PSSL = 0.
45	DA05	O	Outputs DA05 when PSSL = 1. Outputs XRAOF when PSSL = 0.
46	DA04	O	Outputs DA04 when PSSL = 1. Outputs MNT3 when PSSL = 0.
47	DA03	O	Outputs DA03 when PSSL = 1. Outputs MNT2 when PSSL = 0.
48	DA02	O	Outputs DA02 when PSSL = 1. Outputs MNT1 when PSSL = 0.
49	DA01	O	Outputs DA01 when PSSL = 1. Outputs MNT0 when PSSL = 0.

## CIRCUIT DESCRIPTION

Pin No.	Pin name	I/O	Function
50	APTR	O	Control output for correcting aperture. Set to "H" when Rich.
51	APTL	O	Control output for correcting aperture. Set to "H" when Lch.
52	Vss	-	GND.
53	XTAI	I	X'tal oscillation circuit input of 16.9344MHz, or input of 33.8688MHz.
54	XTAO	O	X'tal oscillation circuit output of 16.9344MHz.
55	XTSL	I	X'tal selection input terminal. Set to "L" when x'tal is 16.9344MHz, and to "H" when 33.8688MHz.
56	FSTT	O	2/3 division output of terminals 53 and 54. Does not vary as pitch varies.
57	C4M	O	4.2336MHz output. Varies as pitch varies.
58	C16M	O	16.9344MHz output. Varies as pitch varies.
59	MD2	I	Digital-out ON/OFF control. Turns on when "H", and off when "L".
60	DOUT	O	Digital-out output terminal.
61	EMPH	O	Outputs "H" when playing disc has emphasis, and "L" when the latter does not.
62	WFCK	O	WFCK (Write Frame Clock) output.
63	SCOR	O	Outputs "H" when sub-code sync S0 or S1 is detected.
64	SBSO	O	Serial output of Sub P ~ W.
65	EXCK	I	Clock input for SBSO read out.
66	SQSO	O	Sub Q 80-bit and PCM peak, and level data 16-bit output.
67	SQCK	I	Clock input for SQSO read out.
68	MUTE	I	Mutes when "H", and resets when "L".
69	SENS	-	Outputs SENS to CPU.
70	XRST	I	Resets system when "L".
71	DATA	I	Inputs serial data from CPU.
72	XLAT	I	Latches serial data when latch input from CPU falls.
73	VDD	-	Power supply (+5V).
74	CLOCK	I	Serial data transfer clock input from CPU.
75	SEIN	I	Input SENS from SSP.
76	CNIN	I	Inputs signals for counting number of track jumps.
77	DATO	O	Outputs serial data to SSP.
78	XLTO	O	Outputs serial data latch to SSP, and latches at fall.
79	CLKO	O	Outputs serial data transfer clock to SSP.
80	MIRR	I	Inputs mirror signal. Auto sequencer uses this for jumping 128 or more tracks.

### Notes

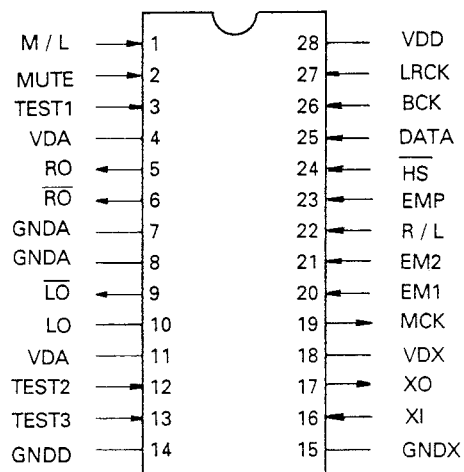
- The 64-bit slot is 2's complement output of LSB first, and the 48-bit slot is 2's complement output of MSB first.
- GTOP is used to monitor the protective condition of the frame sync. ("H" : Sync protective window is released.)
- XUGF is the frame sync obtained from the EFM signal, which is a negative pulse. This is the signal before the protection of sync.
- XPLCK is the inverted clock of EFM PLL. PLL is so made that the falling edge will be matched to the change point of the EFM signal.
- The GFS becomes "H" when the frame sync is matched to the internal protection timing.
- RFCK is a signal having the period of 136μ obtained by the accuracy of X'tal.
- C2P0 is a signal indicating the error condition of data.
- XRAOF is a signal generated when 32 KRAM exceeds the jitter margin of ±28F.

# DP-MA5/MA9

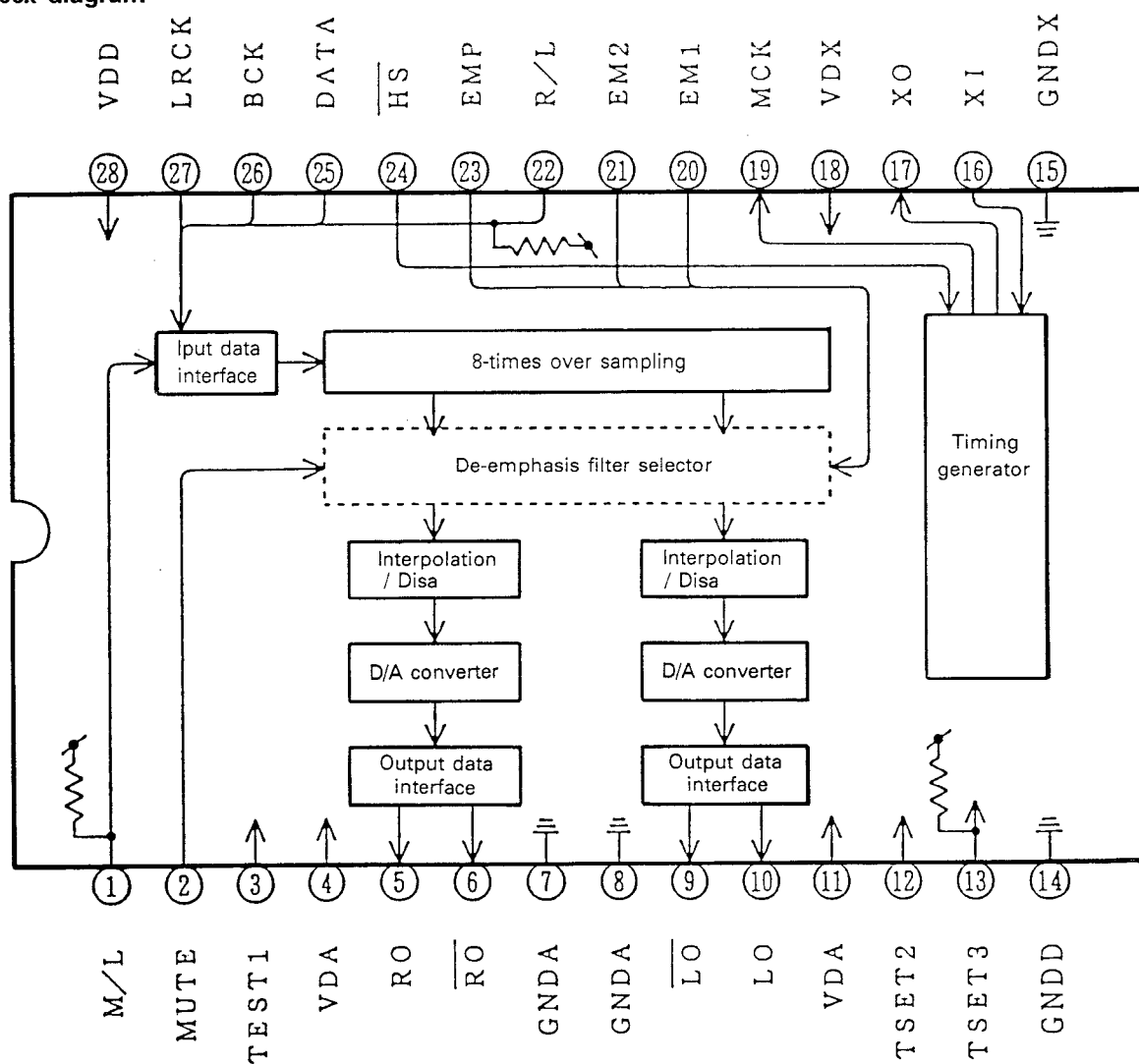
## CIRCUIT DESCRIPTION

### 6. D/A converter : TC9237BF (IC4)

#### 6-1. Terminal connection diagram



#### 6-2. Block diagram



## CIRCUIT DESCRIPTION

### 6-3. Pin functions

Pin No.	Pin name	I/O	Function
1	M/L	I	Selection of MSB first or LSB first. H = MSB, L = LSB.
2	MUTE	I	Muting control. H = Mute ON
3	TEST1	I	Test terminal (connect to H level).
4	VDA	-	Power supply for analog circuit (R-ch).
5	RO	O	R-ch data output.
6	$\overline{RO}$	O	Inverted R-ch output.
7	GNDA	-	Ground for analog circuit (R-ch).
8	GNDA	-	Ground for analog circuit (L-ch).
9	$\overline{LO}$	O	Inverted L-ch data output.
10	LO	O	L-ch data output.
11	VDA	-	Power supply for analog circuit (L-ch).
12	TEST2	I	Test terminal (connect to L level).
13	TEST3	I	Test terminal (connect to H level or open circuit).
14	GND	-	Ground for logic.
15	GNDX	-	Ground for oscillation.
16	XI	I	Generation of clock freq (384fs).
17	XO	O	Generation of clock freq (384fs).
18	VDX	-	Power supply for oscillation.
19	MCK	O	Clock output of system (384fs).
20, 21	EM1, 2	I	De-emphasis filter selector.
22	R / L	I	R / L-ch data selector.
23	EMP	I	De-emphasis filter ON / OFF selector (H = ON, L = OFF).
24	HS	I	Normal or Double speed selector (H = Normal, L = Double).
25	DATA	I	Data input.
26	BCK	I	Bit clock input.
27	LRCK	I	LR clock input.
28	VDD	-	Power supply for logic.

# DP-MA5/MA9

## ADJUSTMENT/REGLAGE

No.	ITEM	INPUT SETTING	OUTPUT SETTING	PLAYER SETTING	ALIGNMENT POINT	ALIGN FOR	FIG.
1	TRACKING ERROR BALANCE	Test disc Type 4	Connect an oscilloscope as follows. CH1: RF (CN3-1) CH2: TE (CN3-6)	Press the P. OPEN/CLOSE key to open the tray. Reset to TEST mode. Then, press the CHECK key. Confirm that the display is "03".	TE BALANCE VR2	Symmetry between upper and lower patterns, or $DC=0\pm0.05V$	(a)
2	FOCUS ERROR BALANCE	Test disc Type 4	Connect an oscilloscope as follows. CH1: RF (CN3-1) CH2: TE (CN3-6)	Press the PLAY key. Confirm that the display is "05".	FE BALANCE VR1	Optimum eyepattern Grating is correctly aligned with the RF level of 1.5Vp-p or more and the TE (servo open) level of 1.5Vp-p or more, the pickup is acceptable.	(b)
3	FOCUS GAIN	Test disc Type 4 Apply signal of 1kHz, 0.1Vrms to CN3 pin 2 and 3.	Connect a LPF to CN3 pin 2-3, to which connect an oscilloscope or two AC voltmeters.	Press the PLAY key. Confirm that the display is "05".	FOCUS GAIN VR3	Two VTVMs should read the same value.	(c)
4	TRACKING GAIN	Test disc Type 4 Apply signal of 1.3kHz, 0.1Vrms to CN3 pin 5 and 6.	Connect a LPF to CN3 pin 5-6, to which connect an oscilloscope or two AC voltmeters.	Press the PLAY key. Confirm that the display is "05".	TRACKING GAIN VR4	Two VTVMs should read the same value.	(c)

(NOTE) Type 4 disc : SONY YEDS-18 TEST DISC or equivalent. LPF: around 47kohms-390pF or so. Adjustment procedures are in TEST MODE.

N°	ARTICLE	ENTREE	SORTIE	MISE EN FONCTIONNEMENT DU LECTEUR	POINT DE CONTROLE	CRITERE D'APPRECIATION	FIG.
1	BALANCE D'ERREUR D'ALIGNEMENT	Disque d'essai de type 4	Brancher un oscilloscope comme suit. CH1 : RF (CN3-1) CH2 : TE (CN3-6)	Appuyer sur la touche P.OPEN/CLOSE pour ouvrir le plateau, puis revenir au mode TEST. Appuyer ensuite sur la touche CHECK et vérifier que l'écran affiche "03".	VR2 POUR BALANCE D'ERREUR D'ALIGNEMENT	Symétrie entre les portions supérieure et inférieure de l'onde, ou $0 \pm 0,05V$ CC	(a)
2	BALANCE D'ERREUR DE FOCALISATION	Disque d'essai de type 4	Brancher un oscilloscope comme suit. CH1 : RF (CN3-1) CH2 : TE (CN3-6)	Appuyer sur la touche PLAY. S'assurer que l'écran affiche "05".	VR1 POUR BALANCE D'ERREUR DE FOCALISATION	Trame optimale Lorsque le réseau de diffraction est correctement aligné et que le niveau de haute fréquence est égal à 1,0 Vc-c ou plus et le niveau d'erreur d'alignement (avec le servomécanisme au repos), à 1,5 Vc-c ou plus, la tête de lecture est considérée comme étant normale	(b)
3	GAIN DE FOCALISATION	Disque d'essai de type 4 Appliquer un signal de 1,0kHz, 0,1Veff. sur les broches 2 et 3 du CN3.	Brancher un filtre passe-bas aux broches 2-3 du CN3 et y connecter un oscilloscope ou deux voltmètres à CA.	Appuyer sur la touche "PLAY". S'assurer que l'écran affiche "05".	GAIN DE FOCALISATION VR3	Deux voltmètres doivent indiquer la même valeur.	(c)
4	GAIN D'ALIGNEMENT	Disque d'essai de type 4 Appliquer un signal de 1,3kHz, 0,1Veff. aux broches 5 et 6 du CN3.	Brancher un filtre passe-bas aux broches 5-6 du CN3 et y connecter un oscilloscope ou deux voltmètres à CA.	Appuyer sur la touche "PLAY". S'assurer que l'écran affiche "05".	GAIN D'ALIGNEMENT VR4	Deux voltmètres doivent indiquer la même valeur.	(c)

(NOTE) Disque de type 4 : DISQUE D'ESSAI SONY YEDS-18 ou équivalent. Filtre passe-bas : autour de 47kohms+390pF environ

La procédure de réglage est en mode TEST.

DP-MA5/MA9

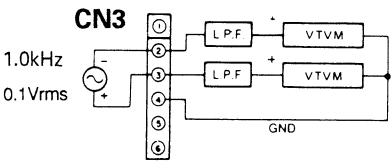
ABGLEICH

Nr.	Gegenstand	Eingang	Ausgang	Player	Abgleich	Abgleichen für	Abb
1	TRACKING-FEHLER BALANCE	Test-CD Typ 4.	Ein oszilloskop folgendermaßen anschließen: CH1 : RF (CN3-1) CH2 : TE (CN-3-6)	Zum öffnen der Lade die Taste P.OPEN/CLOSE drücken und das Gerät auf TEST-Betrieb schalten. Danach die CHECK-Taste drücken. Sicherstellen, daß auf der Anzeige "03" erscheint.	TRACKING-FEHLER BALANCE VR2	Auf Symmetrie zwischen oberem und unterem Muster bzw. eine Gleichspannung von 0±0,05V einstellen.	(a)
2	FOKUS-FEHLER BALANCE	Test-CD Typ 4.	Ein oszilloskop folgendermaßen anschließen: CH1 : RF (CN3-1) CH2 : TRACKING-FEHLER (CN-3-6)	Die PLAY-Taste drücken und sicherstellen, daß auf der Anzeige "05" erscheint.	FOKUS-FEHLER BALANCE VR1	Optimales Augenmuster. Der Abtaster ist zufriedenstellend bei korrekter Fluchtung der Rastereinteilung mit einem RF-Pegel von mindestens 1,5 Vss und einem TRACKING-FEHLER-Pegel (Servo unterbrochen) von mindestens 1,5 Vss.	(b)
2	FOKUS-VERSTÄRKUNG	Test-Disc Typ 4. Den Kontakten 2 und 3 von CN3 ein Signal von 1,0kHz, 0,1Veff zuleiten.	Ein Tiefpaßfilter an die Kontakte 2 und 3 von CN3 anschließen, und ein Oszilloskop oder zwei Wechselstrom-Voltmeter anschließen.	Die PLAY-Taste drücken. Sicherstellen, daß im Display "05" angezeigt wird.	FOCUS GAIN VR3 (Potentiometer)	Zwei VTVM müssen den gleichen Wert zeigen.	(c)
3	SPURHALTE VERSTÄRKUNG	Test-Disc Typ 4. Den Kontakten 5 und 6 von CN3 ein Signal von 1,3kHz, 0,1Veff zuleiten.	Ein Tiefpaßfilter an die Kontakte 5 und 6 von CN3 anschließen, und ein Oszilloskop oder zwei Wechselstrom-Voltmeter anschließen.	Die PLAY-Taste drücken. Sicherstellen, daß im Display "05" angezeigt wird.	TRACKING GAIN VR4 (Potentiometer)	Zwei VTVM müssen den gleichen Wert zeigen.	(c)

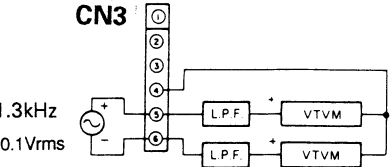
(Zur Beachtung) Test-Disc Typ 4 : Sony YEDS-18 Test-Disc oder gleichwertig. Tiefpaßfilter : ca. 47k0hm+390pF.  
Einstellverfahren im prüfbetrieb (TEST MODE).

(c)Focus Gain and Tracking Gain Adj.

Focus gain adj.



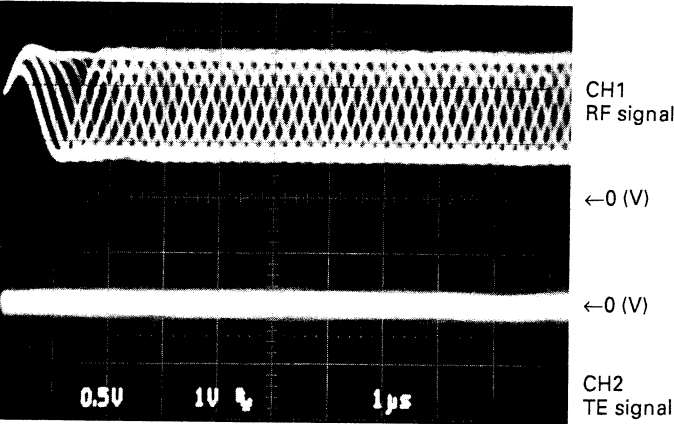
Tracking gain adj.



DP-MA5/MA9

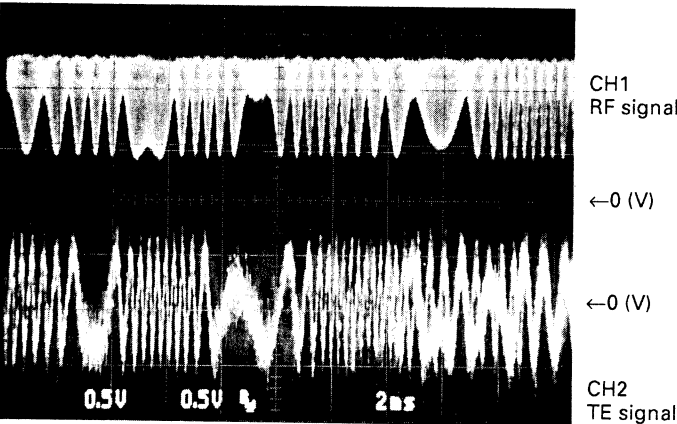
ADJUSTMENT

RF level Wave-form



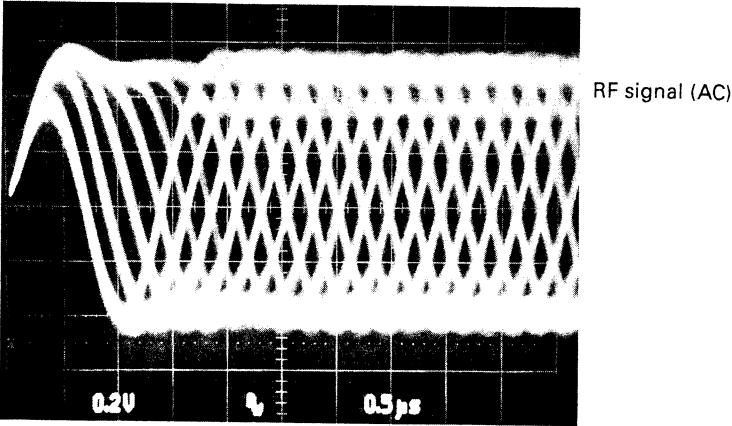
- RF signal and E.Spot signal in test mode (PLAY).

Tracking error balance



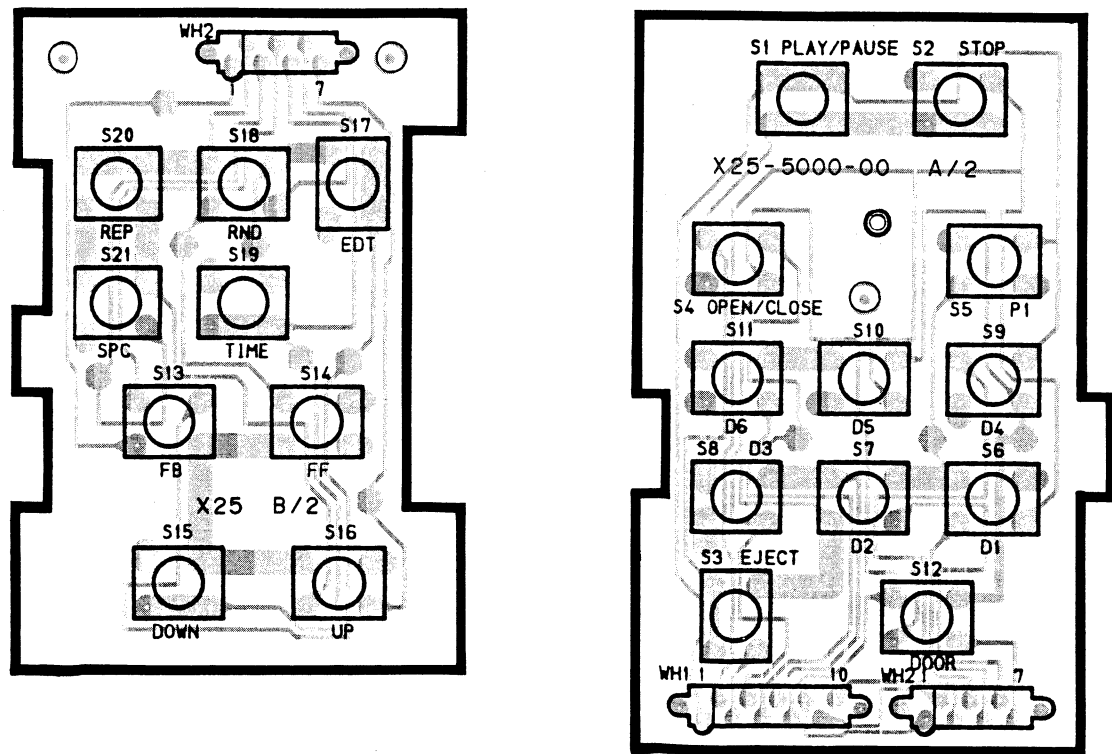
- RF signal and T.Error signal; in test mode (Focusing ON). (Disc type 4)
- Adjust T.Error so that the waveform is symmetrical above and below 0V (VR2).

Focus error balance

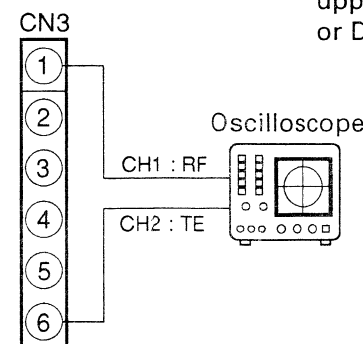


- RF signal in test mode (PLAY).
- Perform the tangential and focusing offset adjustments so that each of the center cross points are focused into one point on the display. The crossing points above and below the center shall also be displayed clearly.

A B C D E F G H I J

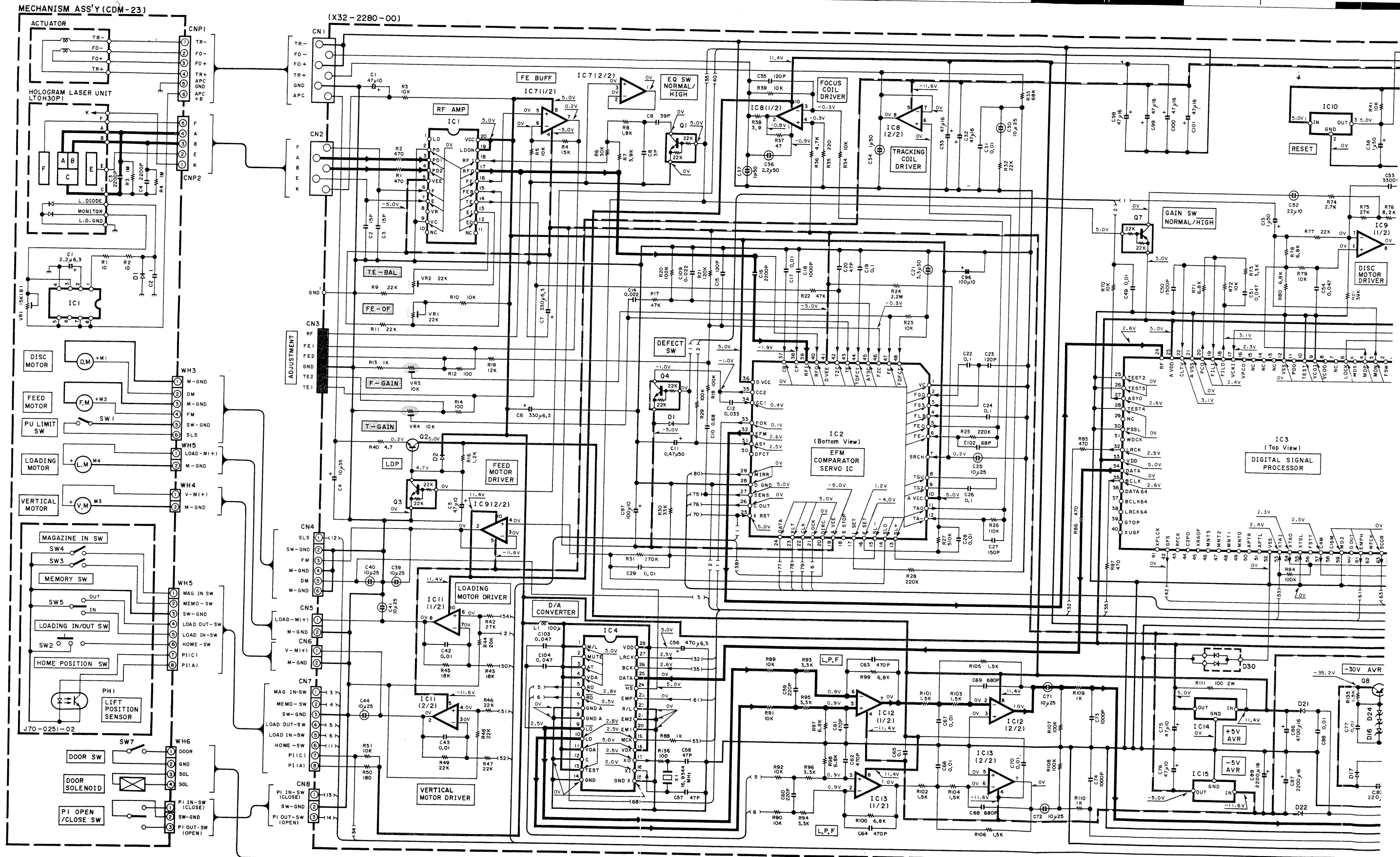


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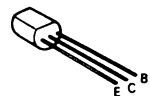


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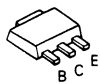
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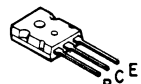
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DTC124EU  
2SC4081



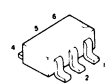
2SB1308



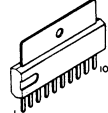
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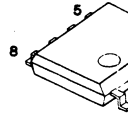
HN2D01F



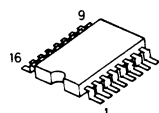
LA6510  
TA8410AK



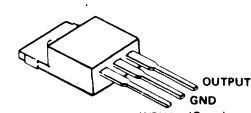
NJM4565M



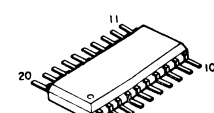
TC74HC165AF



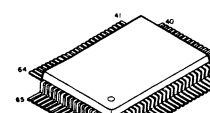
LM2940CT-5.0



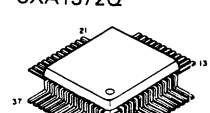
CXA1571M

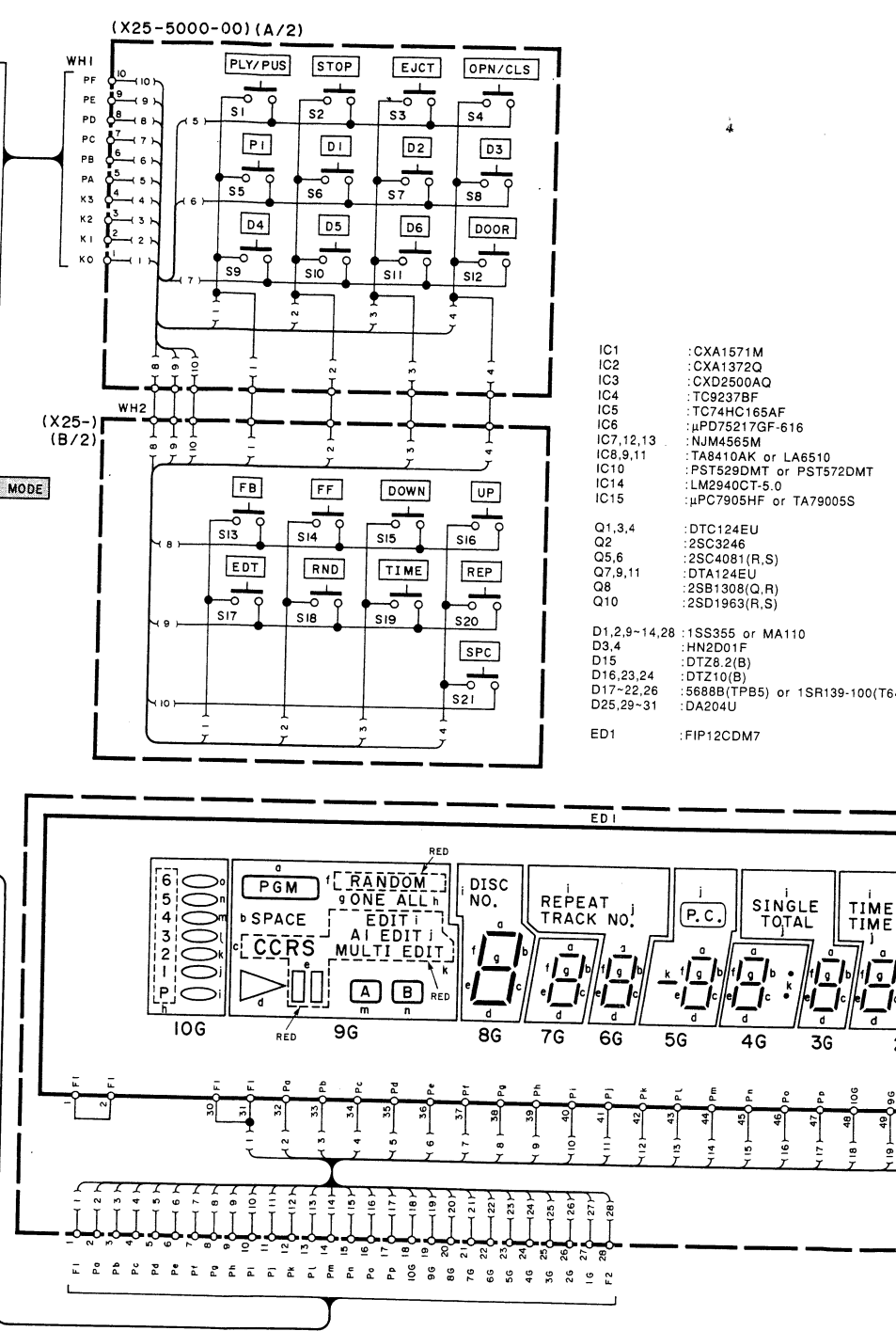
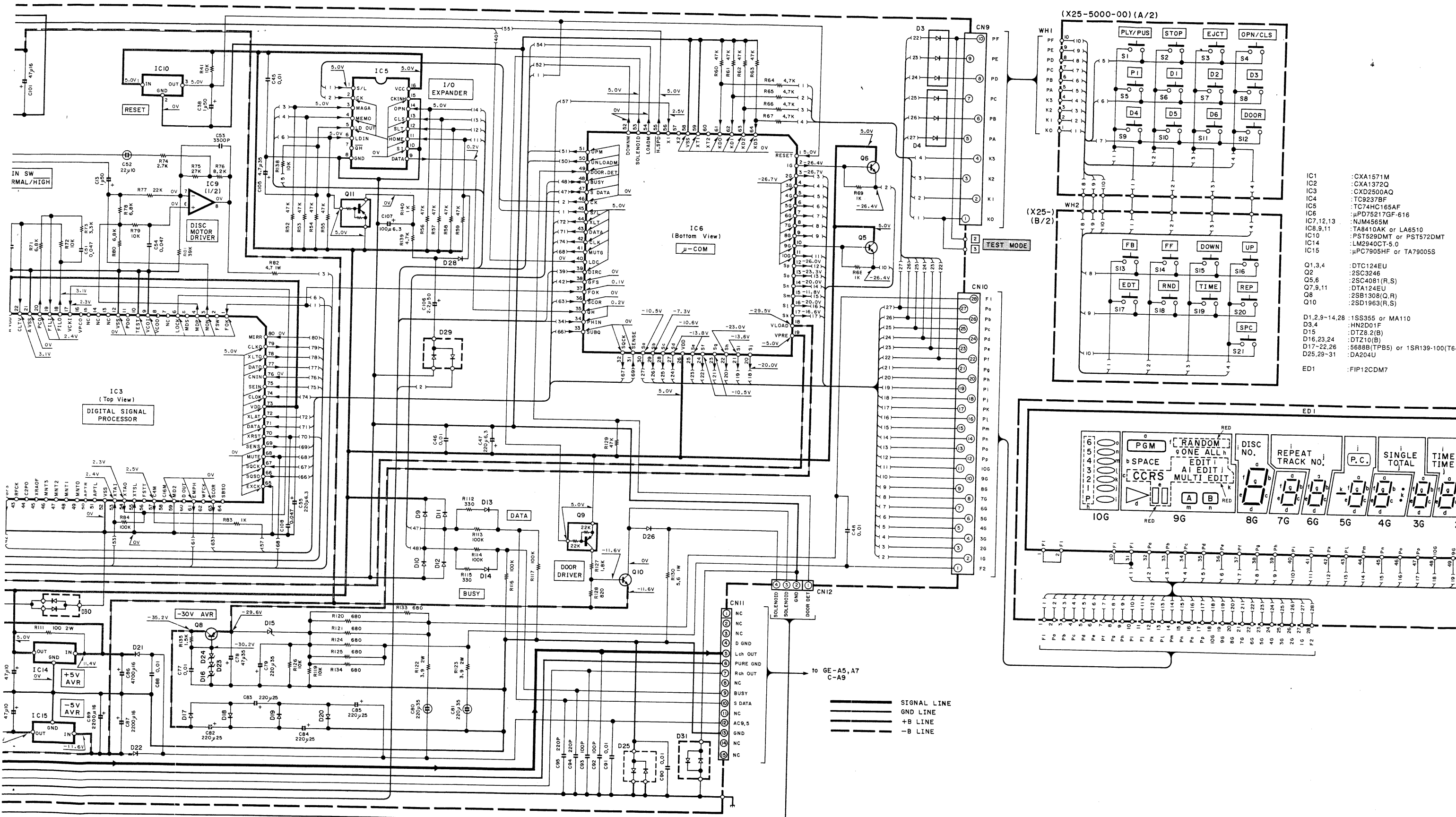


CXD2500AQ

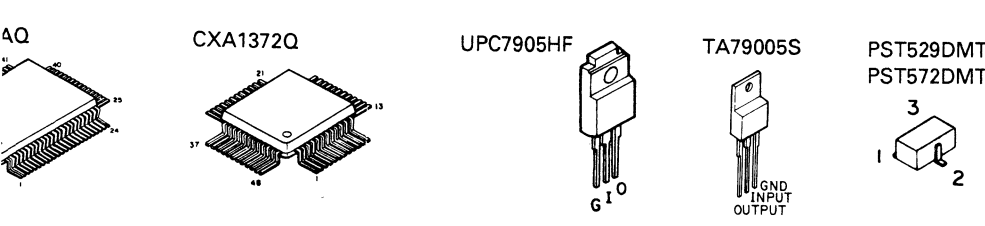


CXA1372Q





- IC1 : CXA1571M  
 IC2 : CXA1372Q  
 IC3 : CXD2500AQ  
 IC4 : TC9237BF  
 IC5 : TC74HC165AF  
 IC6 : μPD75217GF-616  
 IC7,12,13 : NJM4555M  
 IC8,9,11 : TA8410AK or LA6510  
 IC10 : PST529DMT or PST572DMT  
 IC14 : LM2940CT-5.0  
 IC15 : μPC7905HF or TA79005S
- Q1,3,4 : DTC124EU  
 Q2 : 2SC3246  
 Q5,6 : 2SC4081(R,S)  
 Q7,9,11 : DTA124EU  
 Q8 : 2SB1308(Q,R)  
 Q10 : 2SD1963(R,S)
- D1,2,9-14,28 : 1SS355 or MA110  
 D3,4 : HN2001F  
 D15 : DTZ8,2(B)  
 D16,23,24 : DTZ10(B)  
 D17-22,26 : 5688B(TPB5) or 1SR139-100(T64)  
 D25,29-31 : DA204U
- ED1 : FIP12CDM7



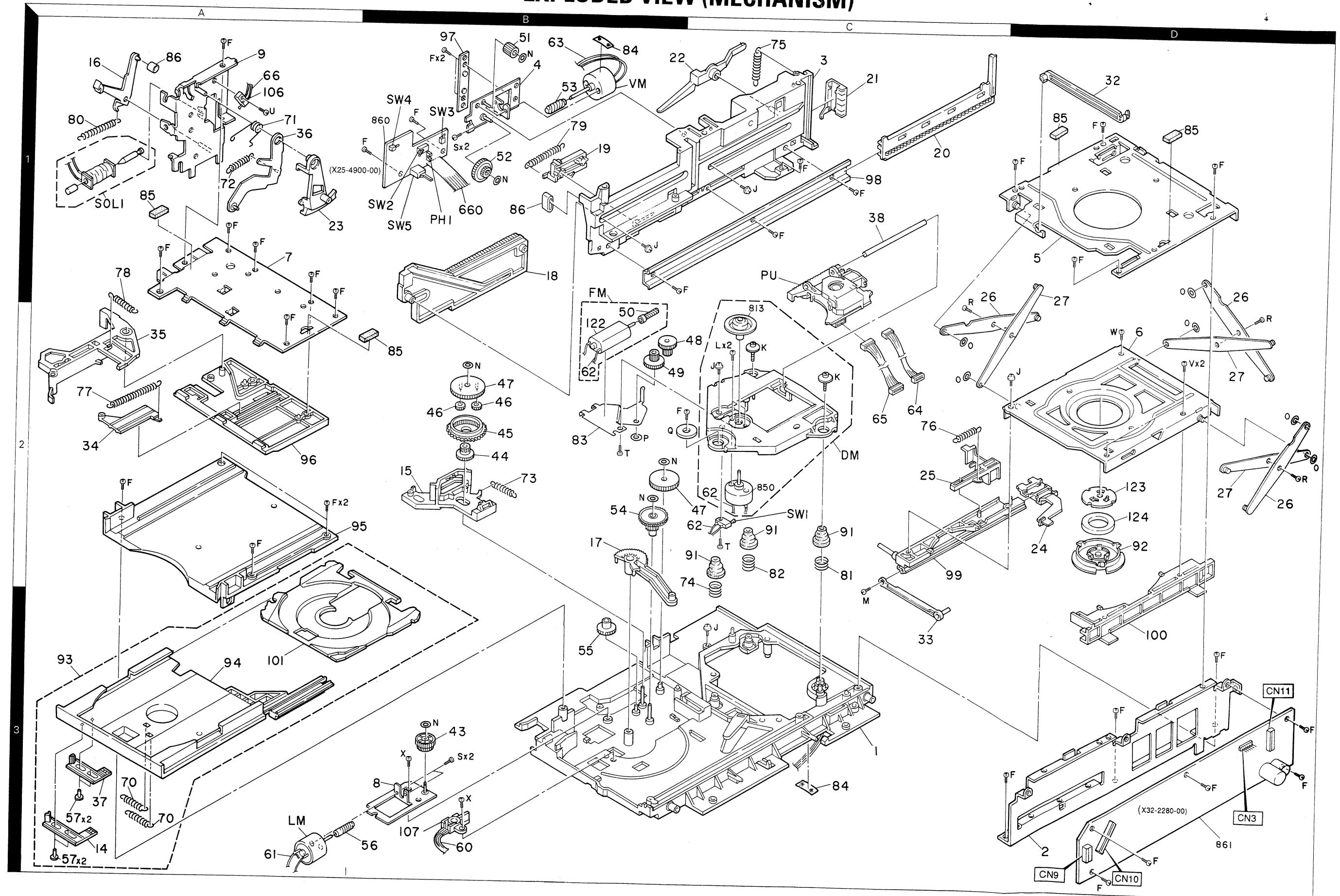
**CAUTION :** For continued safety, replace safety critical components only with manufacturer's recommended parts (refer to parts list). Δ Indicates safety critical components. To reduce the risk of electric shock, leakage-current or resistance measurements shall be carried out (exposed parts are acceptably insulated from the supply circuit) before the appliance is returned to the customer.

• DC voltages are as measured with a high impedance voltmeter. Values may vary slightly due to variations between individual instruments or/and units

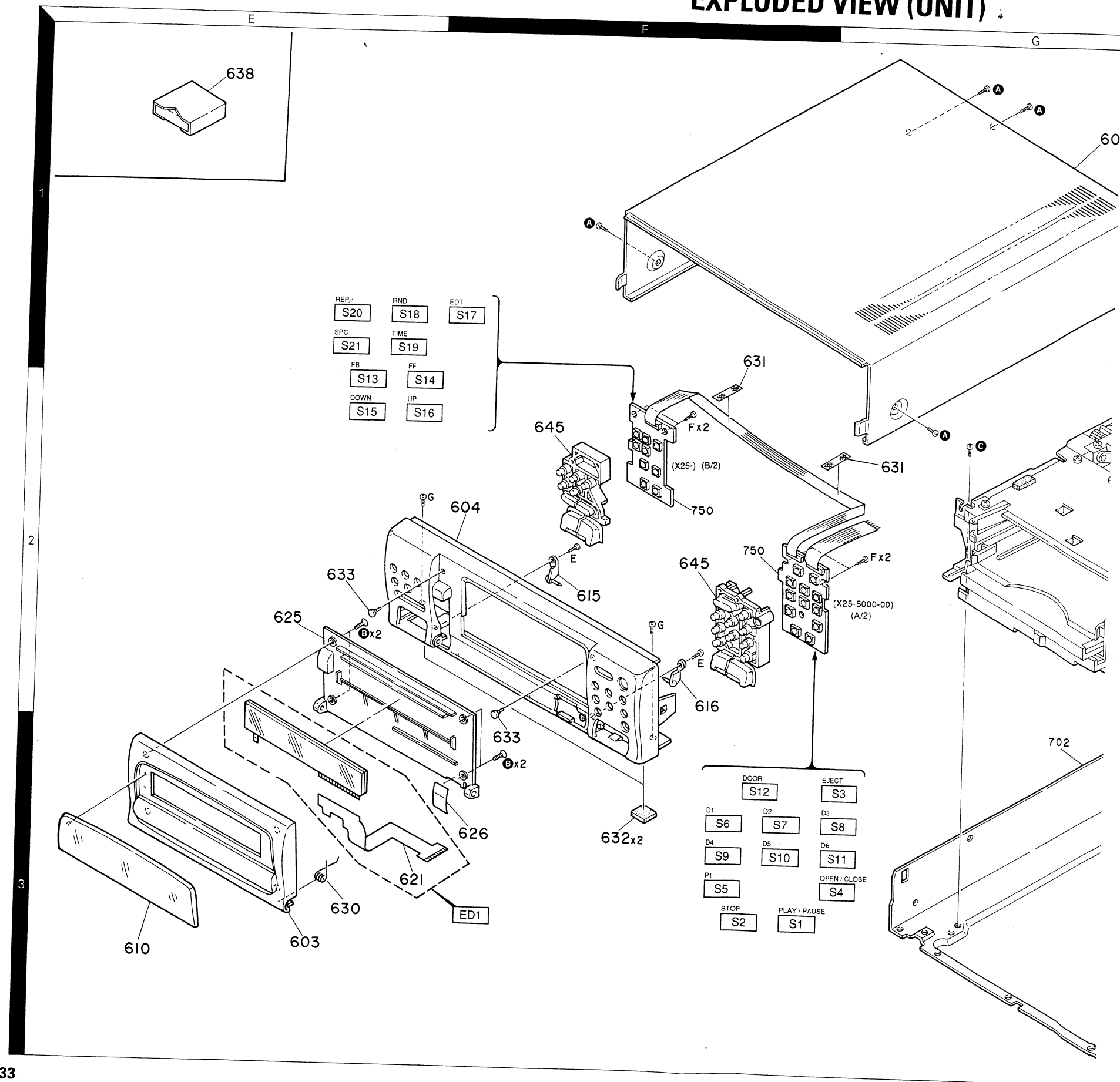
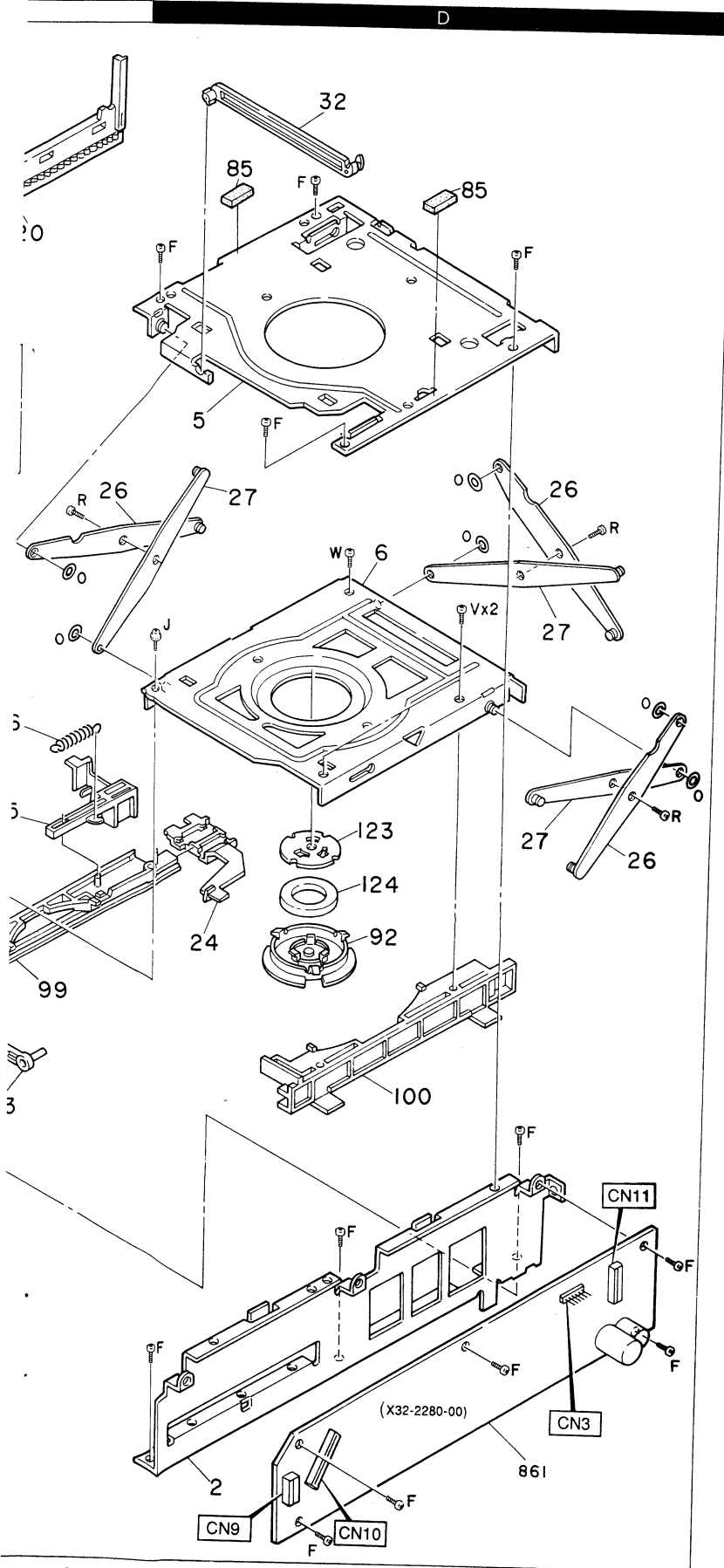


# DP-MA5/MA9 DP-MA5/MA9

## EXPLODED VIEW (MECHANISM)



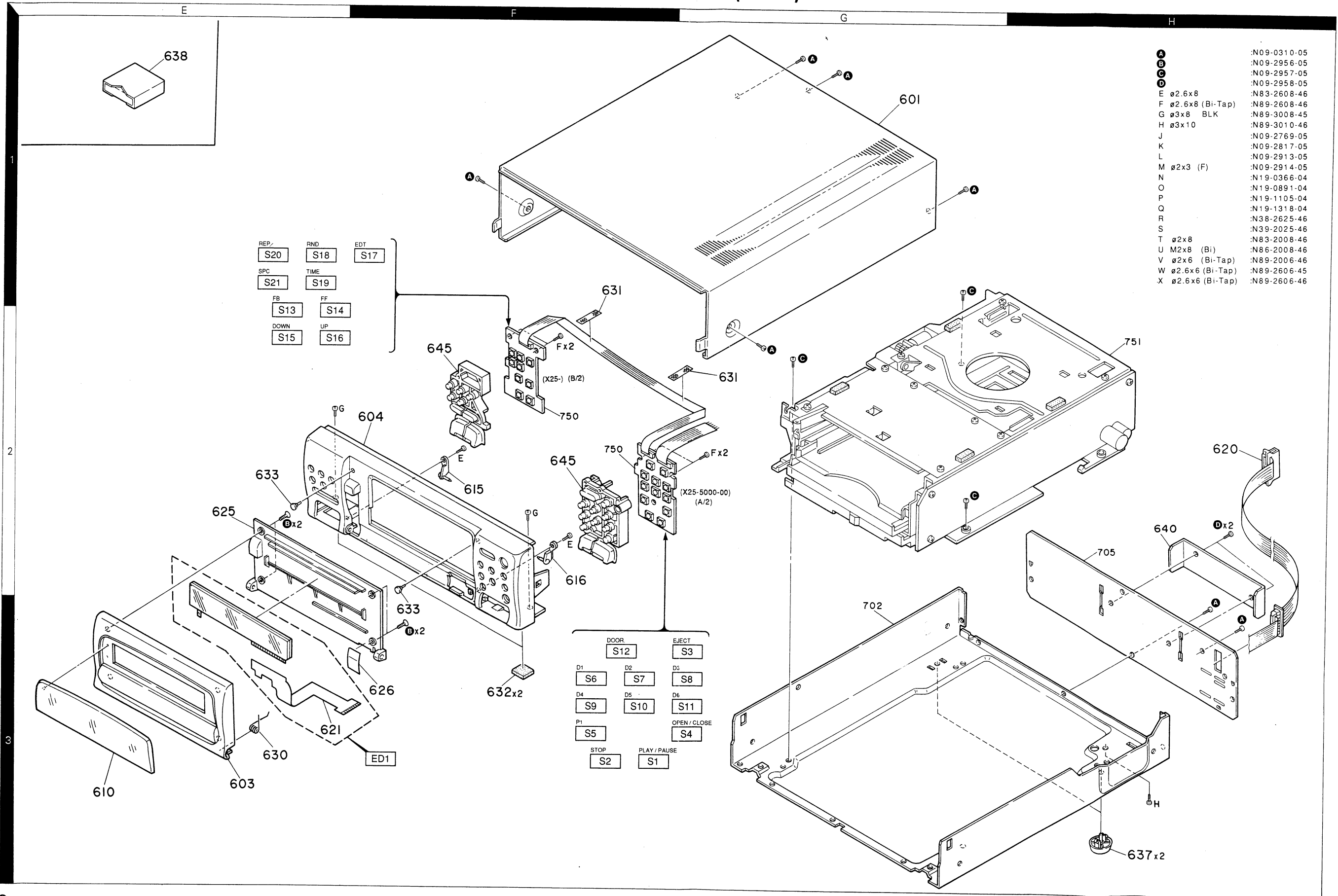
Parts with the exploded numbers larger than 700 are not supplied.





# DP-MA5/MA9 DP-MA5/MA9

## EXPLODED VIEW (UNIT)



A	:N09-0310-05
B	:N09-2956-05
C	:N09-2957-05
D	:N09-2958-05
E	ø2.6x8 :N83-2608-46
F	ø2.6x8 (Bi-Tap) :N89-2608-46
G	ø3x8 BLK :N89-3008-45
H	ø3x10 :N89-3010-46
J	:N09-2769-05
K	:N09-2817-05
L	:N09-2913-05
M	ø2x3 (F) :N09-2914-05
N	:N19-0366-04
O	:N19-0891-04
P	:N19-1105-04
Q	:N19-1318-04
R	:N38-2625-46
S	:N39-2025-46
T	ø2x8 :N83-2008-46
U	M2x8 (Bi) :N86-2008-46
V	ø2x6 (Bi-Tap) :N89-2006-46
W	ø2.6x6 (Bi-Tap) :N89-2606-45
X	ø2.6x6 (Bi-Tap) :N89-2606-46

DOOR	EJECT
S12	S3
D1	D5
S6	S8
D4	D6
S9	S11
P1	OPEN / CLOSE
S5	S4
STOP	PLAY / PAUSE
S2	S1

## PARTS LIST

× New Parts

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Teile ohne Parts No. werden nicht geliefert.

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕向	Re- marks 備考
<b>DP-MA5</b>						
601	1G	*	A01-2970-01	METALLIC CABINET	E T	
603	3E	*	A29-0319-12	PANEL		
604	2F	*	A60-0291-11	PANEL		
610	3E		B10-0972-04	FRONT GLASS		
-			B46-0122-23	WARRANTY CARD		
-			B46-0143-13	WARRANTY CARD		
-		*	B59-0179-04	CAUTION CARD		
615	2F	*	D19-0274-04	PIN		
616	2F	*	D19-0275-04	PIN		
620		*	E30-2713-05	CORD WITH CONNECTOR		
621	3E	*	E35-0385-04	FRAT CABLE	M KPYXTE  KPMYX	
625	2E	*	F07-0700-13	COVER		
626	3F	*	F19-1036-04	BLIND PLATE		
630	3E	*	G09-0625-14	SPRING		
631	1F, 2G		G10-0173-04	NON-WOVEN FABRIC		
632	3F		G11-2052-14	CUSHION		
633	2E, 3F		G13-0182-04	CUSHION		
-		*	H10-5360-12	POLYSTYRENE FOAMED FIXTURE		
-		*	H10-5361-12	POLYSTYRENE FOAMED FIXTURE		
-			H20-0576-04	PROTECTION COVER		
-			H25-0681-04	PROTECTION BAG		
-		*	H30-0077-04	ADHESIVE DOUBLE-COATED TAPE		
-		*	H50-0459-04	ITEM CARTON CASE		
637	3H		J02-0370-05	FOOT		
638	1E	*	J19-3394-13	HOLDER ASSY		
640	2H		J21-5947-04	WIRE BAND		
645	2F	*	K29-4457-12	KNOB		
ED1	3F	*	FIP12CDM7	INDICATOR TUBE		
<b>DP-MA9</b>						
601	1G	*	A01-2970-01	METALLIC CABINET	E T	
603	3E	*	A29-0318-12	PANEL		
604	2F	*	A60-0290-11	PANEL		
610	3E	*	B10-1934-03	FRONT GLASS		
-			B46-0122-23	WARRANTY CARD		
-			B46-0143-13	WARRANTY CARD		
-		*	B59-0179-04	CAUTION CARD		
615	2F	*	D19-0274-04	PIN		
616	2F	*	D19-0275-04	PIN		
620	2H	*	E30-2713-05	CORD WITH CONNECTOR		
621	3E	*	E35-0435-08	WIRING HARNESS		
625	2E	*	F07-0700-13	COVER		
626	3F	*	F19-1036-04	BLIND PLATE		
630	3E	*	G09-0625-14	SPRING		
631	1F, 2G		G10-0173-04	NON-WOVEN FABRIC		
632	3F		G11-2052-14	CUSHION		
633	2E, 3F		G13-0182-04	CUSHION		

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# DP-MA5/MA9

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-		*	H10-5360-12	POLYSTYRENE FOAMED FIXTURE		
-		*	H10-5361-12	POLYSTYRENE FOAMED FIXTURE		
-			H20-0566-04	PROTECTION COVER	M	
-			H25-0397-04	PROTECTION BAG	KPXE	
-			H25-0659-04	PROTECTION BAG	T	
-		*	H30-0077-04	ADHESIVE DOUBLE-COATED TAPE		
-		*	H50-0425-04	ITEM CARTON CASE	KPMX	
-		*	H50-0458-04	ITEM CARTON CASE	TE	
-		*	H50-0460-04	ITEM CARTON CASE	TE	
637	3H		J02-0370-05	FOOT		
638	1E	*	J19-3394-13	HOLDER ASSY		
-			J61-0307-05	WIRE BAND		
645	2F	*	K29-4457-12	KNOB		
ED1	3F	*	FIP12CDM7	INDICATOR TUBE		
<b>MECHANISM PCB (X25-5000-00)</b>						
660	1B	*	E35-0389-05	WIRING HARNESS		
SW2	1B	*	S64-0006-05	LEVER SWITCH		
SW3 ,4	1B	*	S68-0025-05	PUSH SWITCH		
SW5	1B		S33-2062-05	LEVER SWITCH		
PH1	1B		T95-0123-05	OPTO ISOLATOR		
<b>SWITCH (X25-5000-00)</b>						
S1 -21			S40-1064-05	PUSH SWITCH		
<b>CONTROL (X32-2280-00)</b>						
C1			CE04KW1A470M	ELECTRO	47UF	10WV
C2 ,3			CC73FSL1H150J	CHIP C	15PF	J
C4			CE04KW1V100M	ELECTRO	10UF	35WV
C5			CE04KW1A470M	ELECTRO	47UF	10WV
C6 ,7			CE04KW0J331M	ELECTRO	330UF	6.3WV
C8			CC73FSL1H030C	CHIP C	3PF	C
C9			CC73FSL1H390J	CHIP C	39PF	J
C10			CK73EF1C684Z	CHIP C	0.68UF	Z
C11			CE04KW1HR47M	ELECTRO	0.47UF	50WV
C12			CK73FB1H333K	CHIP C	0.033UF	K
C13			CE04KW1H010M	ELECTRO	1.0UF	50WV
C14			CK73FB1H223K	CHIP C	0.022UF	K
C15			CC73FSL1H121J	CHIP C	120PF	J
C16			CK73FB1H222K	CHIP C	2200PF	K
C17			CK73FB1H103K	CHIP C	0.010UF	K
C18			CK73FB1H102K	CHIP C	1000PF	K
C19			CK73FB1E104K	CHIP C	0.10UF	K
C20			CC73FSL1H470J	CHIP C	47PF	J
C21			CE04HW1H3R3M	NP-ELEC	3.3UF	50WV
C22			CK73FB1E104K	CHIP C	0.10UF	K
C23			CC73FSL1H121J	CHIP C	120PF	J
C24			CK73FB1E104K	CHIP C	0.10UF	K
C25			CE04HW1E100M	NP-ELEC	10UF	25WV
C26			CK73FB1E104K	CHIP C	0.10UF	K
C27			CC73FSL1H151J	CHIP C	150PF	J
C28 ,29			CK73FB1H103K	CHIP C	0.010UF	K
C30			CE04HW1E100M	NP-ELEC	10UF	25WV
C31			CK73FB1H103K	CHIP C	0.010UF	K

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C32 ,33 C34 C35 C36 C37			CE04KW1C470M CE04HW1H010M CC73FSL1H121J CE04HW1H2R2M CE04HW1H010M	ELECTR0 47UF 16WV NP-ELEC 1.0UF 50WV CHIP C 120PF J NP-ELEC 2.2UF 50WV NP-ELEC 1.0UF 50WV		
C38 C39 -41 C42 ,43 C44 C45 ,46			CE04KW1H010M CE04HW1E100M CK73FB1H103K CE04HW1E100M CK73FB1H103K	ELECTR0 1.0UF 50WV NP-ELEC 10UF 25WV CHIP C 0.010UF K NP-ELEC 10UF 25WV CHIP C 0.010UF K		
C47 C48 ,49 C50 C51 C52			CE04KW0J221M CK73FB1H103K CK73FB1H152K CK73FB1H473K CE04HW1A220M	ELECTR0 220UF 6.3WV CHIP C 0.010UF K CHIP C 1500PF K CHIP C 0.047UF K NP-ELEC 22UF 10WV		
C53 C54 C55 C56 C57 ,58			CK73FB1H332K CK73FB1H473K CE04KW0J221M CE04KW0J471M CC73FCH1H470J	CHIP C 3300PF K CHIP C 0.047UF K ELECTR0 220UF 6.3WV ELECTR0 470UF 6.3WV CHIP C 47PF J		
C59 ,60 C61 -64 C65 C66 ,67 C68 ,69			CC73FSL1H221J CK73FB1H471K CK73FB1E104K CK73FB1H103K CK73FB1H681K	CHIP C 220PF J CHIP C 470PF K CHIP C 0.10UF K CHIP C 0.010UF K CHIP C 680PF K		
C70 C71 ,72 C73 ,74 C75 ,76 C77			CK73FB1H103K CE04HW1E100M CK73FB1H102K CE04KW1A470M CK73FB1H103K	CHIP C 0.010UF K NP-ELEC 10UF 25WV CHIP C 1000PF K ELECTR0 47UF 10WV CHIP C 0.010UF K		
C78 C79 C80 ,81 C82 -85 C86		*	CE04KW1V470M CE04KW1V221M CE04HW1V221M CE04KW1E221M CE04KW1C472M	ELECTR0 47UF 35WV ELECTR0 220UF 35WV NP-ELEC 220UF 35WV ELECTR0 220UF 25WV ELECTR0 4700UF 16WV		
C87 C88 C89 C90 ,91 C92 ,93			CE04KW1C222M CK73FB1H103K CE04KW1C222M CK73FB1H103K CC73FSL1H101J	ELECTR0 2200UF 16WV CHIP C 0.010UF K ELECTR0 2200UF 16WV CHIP C 0.010UF K CHIP C 100PF J		
C94 ,95 C96 ,97 C98 -101 C102 C103,104			CC73FSL1H221J CE04KW1A101M CE04KW1C470M CC73FSL1H680J CK73FB1H473K	CHIP C 220PF J ELECTR0 100UF 10WV ELECTR0 47UF 16WV CHIP C 68PF J CHIP C 0.047UF K		
C105 C106 C107 C108 C109			CE04KW1V4R7M C90-3254-05 C90-3214-05 CK73FB1H473K CK73FB1H223K	ELECTR0 4.7UF 35WV ELECTR0 2.2UF 50WV ELECTR0 100UF 6.3WV CHIP C 0.047UF K CHIP C 0.022UF K		
-			J11-0098-05	WIRE CLAMPER		
L1 X1			L33-0369-05 L77-1164-05	CHOKE COIL CRYSTAL RESONATOR		

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R82 R111 R122, 123 R130 VR1 ,2			RS14KB3A4R7J RS14KB3D101J RS14KB3D3R9J RS14KB3A5R6J R12-3686-05	FL-PROOF RS 4.7 J 1W FL-PROOF RS 100 J 2W FL-PROOF RS 3.9 J 2W FL-PROOF RS 5.6 J 1W TRIMMING POT.(22K)		
VR3 ,4 W1 -3 W4 W5 -13 W14			R12-3685-05 R92-0679-05 R92-0670-05 R92-0679-05 R92-0670-05	TRIMMING POT.(10K) CHIP R 0 OHM CHIP R 0 OHM CHIP R 0 OHM CHIP R 0 OHM		
D1 ,2 D1 ,2 D3 ,4 D9 -14 D9 -14		*	MA110 1SS355 HN2D01F MA110 1SS355	DIODE DIODE DIODE DIODE DIODE		
D15 D16 D17 -22 D17 -22 D23 ,24		*	DTZ8.2(B) DTZ10(B) S5688B(TPB5) 1SR139-100(T64) DTZ10(B)	ZENER DIODE ZENER DIODE DIODE DIODE ZENER DIODE		
D25 D26 D26 D28 D28		*	DA204U S5688B(TPB5) 1SR139-100(T64) MA110 1SS355	DIODE DIODE DIODE DIODE DIODE		
D29 -31 IC1 IC2 IC3 IC4		*	DA204U CXA1571M CXA1372Q CXD2500AQ TC9237BF	DIODE IC(CD RF AMP) IC(CD RF SERVØ) IC(SIGNAL PROCESSOR) IC(D/A CONVERTER)		
IC5 IC6 IC7 IC8 ,9 IC8 ,9		*	TC74HC165AF UPD75217GF-616 NJM4565M LA6510 TA8410AK	IC(8BIT SHIFT REGISTER) IC IC(OP AMP) IC(DUAL POWER OP AMP) IC(POWER OP AMP)		
IC10 IC10 IC11 IC11 IC11 IC12,13		*	PST529DMT PST572DMT LA6510 TA8410AK NJM4565M	IC(SYSTEM RESET) IC(SYSTEM RESET) IC(DUAL POWER OP AMP) IC(POWER OP AMP) IC(OP AMP)		
IC14 IC15 IC15 Q1 Q2			LM2940CT-5.0 TA79005S UPC7905HF DTC124EU 2SC3246	IC(LOW VOLTAGE REGULATOR) IC(VOLTAGE REGULATOR/ -5V) IC(VOLTAGE REGULATOR/ -5V) DIGITAL TRANSISTOR TRANSISTOR		
Q3 ,4 Q5 ,6 Q7 Q8 Q9			DTC124EU 2SC4081(R,S) DTA124EU 2SB1308(Q,R) DTA124EU	DIGITAL TRANSISTOR TRANSISTOR DIGITAL TRANSISTOR TRANSISTOR DIGITAL TRANSISTOR		
Q10 Q11			2SD1963(R,S) DTA124EU	TRANSISTOR DIGITAL TRANSISTOR		
<b>MECHANISM (X92-1740-10)</b>						
1	3C	*	A10-3025-01	CHASSIS ASSY		

L:Scandinavia

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△ indicates safety critical components.

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2	3D	*	A11-0742-02	SUB CHASSIS		
3	1C	*	A11-0745-01	SUB CHASSIS		
4	1B	*	A11-0746-04	SUB CHASSIS CALKING ASSY		
5	1D	*	A11-0750-02	SUB CHASSIS		
6	2D	*	A11-0752-02	SUB CHASSIS		
7	1A	*	A11-0753-03	SUB CHASSIS		
8	3B	*	A11-0763-04	SUB CHASSIS CALKING ASSY		
9	1A	*	A11-0765-04	SUB CHASSIS CALKING ASSY		
14	3A		D10-3105-03	SLIDER		
15	2B	*	D10-3257-03	SLIDER		
16	1A	*	D10-3258-03	ARM		
17	2B	*	D10-3260-03	ARM		
18	1B	*	D10-3261-03	SLIDER		
19	1B	*	D10-3262-04	SLIDER		
20	1C	*	D10-3263-03	SLIDER		
21	1C	*	D10-3264-04	SLIDER		
22	1B	*	D10-3265-04	ARM		
23	1A	*	D10-3266-03	ARM		
24	2D	*	D10-3267-03	ARM		
25	2C	*	D10-3268-03	SLIDER		
26	1C, 1D	*	D10-3269-04	ARM ASSY		
27	1D, 2D	*	D10-3271-04	ARM ASSY		
32	1D	*	D10-3273-03	ARM		
33	3C	*	D10-3274-04	ARM		
34	2A	*	D10-3275-04	SLIDER		
35	2A	*	D10-3276-03	ARM		
36	1A	*	D10-3278-04	ARM ASSY		
37	3A	*	D10-3281-03	SLIDER		
38	1C	*	D10-3294-14	ROD		
43	3B	*	D13-0983-04	GEAR		
44	2B	*	D13-0984-04	GEAR		
45	2B	*	D13-0985-04	GEAR		
46	2B	*	D13-0986-04	GEAR		
47	2B, 2C	*	D13-0987-04	GEAR		
48	2C	*	D13-0989-04	GEAR		
49	2C	*	D13-0990-04	GEAR		
50	2B	*	D13-0991-04	GEAR		
51	1B	*	D13-0992-04	GEAR		
52	1B	*	D13-0993-04	GEAR		
53	1B	*	D13-0994-04	GEAR		
54	2B	*	D13-0995-04	GEAR		
55	3B	*	D13-0996-04	GEAR		
56	3B	*	D13-1502-04	WORM		
57	3A		D21-1633-05	SHAFT		
60	3B	*	E35-0388-05	WIRING HARNESS		
61	3A	*	E35-0390-05	WIRING HARNESS		
62	2B, 2C	*	E35-0391-05	WIRING HARNESS		
63	1B	*	E35-0392-05	WIRING HARNESS		
64	2C	*	E35-0417-05	WIRING HARNESS		
65	2C	*	E35-0418-05	WIRING HARNESS		
66	1A	*	E35-0435-08	WIRING HARNESS		
70	3A		G01-3333-04	EXTENSION SPRING		
71	1A	*	G01-3470-08	TORSION COIL SPRING		

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# DP-MA5/MA9

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72	1A	*	G01-3471-08	EXTENSION SPRING		
73	2B	*	G01-3472-04	EXTENSION SPRING		
74	2C	*	G01-3473-04	COMPRESSION SPRING		
75	1C	*	G01-3474-04	EXTENSION SPRING		
76	2C	*	G01-3475-04	EXTENSION SPRING		
77	2A	*	G01-3476-04	EXTENSION SPRING		
78	1A	*	G01-3477-04	EXTENSION SPRING		
79	1B	*	G01-3480-04	EXTENSION SPRING		
80	1A	*	G01-3481-08	EXTENSION SPRING		
81	2C	*	G01-3485-04	COMPRESSION SPRING		
82	2C	*	G01-3518-04	COMPRESSION SPRING		
83	2B	*	G02-1002-04	FLAT SPRING		
84	1B, 3C	*	G10-0146-04	NON-WOVEN FABRIC		
85	1A, 1D	*	G11-0129-04	SOFT TAPE (20X7X3)		
86	1A, 1B	*	G11-2134-08	CUSHION		
91	2C	*	J02-1058-15	INSULATOR		
92	2D	*	J11-0181-03	CLAMPER		
93	3A	*	J19-3485-02	HOLDER ASSY		
94	3A	*	J19-3486-01	HOLDER		
95	2B	*	J19-3487-02	HOLDER		
96	2A	*	J19-3489-02	HOLDER		
97	1B	*	J21-5922-04	MOUNTING HARDWARE		
98	1C	*	J90-0685-03	GUIDE		
99	2C	*	J90-0686-04	RAIL ASSY		
100	3D	*	J90-0688-03	RAIL		
101	3A	*	J99-0517-02	TRAY		
△ 106	1A	*	S33-1002-05	LEVER SWITCH (POWER TYPE)		
107	3B	*	S33-2061-05	LEVER SWITCH		
SW1	2C	*	S33-1022-05	LEVER SWITCH		
122	2B	*	T42-0597-05	DC MOTOR		
123	2D	*	T50-1055-04	Yoke		
124	2D	*	T99-0503-15	MAGNET		
DM	2C	*	A11-0780-04	SUB CHASSIS ASSY		
FM	1B	*	T42-0612-04	MOTOR ASSY		
LM	3A	*	T42-0620-05	DC MOTOR		
PU	1C	*	T25-0023-05	OPTICAL PICKUP HEAD		
SOL1	1A	*	T94-0227-08	MAGNETIC PLUNGER		
VM	1B	*	T42-0567-05	DC MOTOR		

L:Scandinavia

K:USA

P:Canada

Y:PX(Far East, Hawaii)

T:England

E:Europe

Y:AAFES(Europe)

X:Australia

M:Other Areas

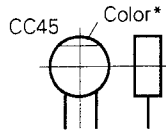
△ indicates safety critical components

## PARTS LIST

### CAPACITORS

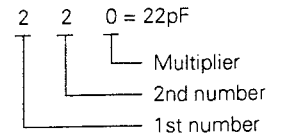
CC 45 TH 1H 220 J  
1 2 3 4 5 6

- 1 = Type ... ceramic, electrolytic, etc.  
2 = Shape ... round, square, ect.  
3 = Temp. coefficient  
4 = Voltage rating  
5 = Value  
6 = Tolerance



#### Capacitor value

010 = 1pF  
100 = 10pF  
101 = 100pF  
102 = 1000pF = 0.001μF  
103 = 0.01μF



#### Temperature coefficient

1st Word	C	L	P	R	S	T	U
Color*	Black	Red	Orange	Yellow	Green	Blue	Violet
ppm/°C	0	-80	-150	-220	-330	-470	-750

2nd Word	G	H	J	K	L
ppm/°C	±30	±60	±120	±250	±500

Example : CC45TH = -470 ± 60ppm/°C

#### Tolerance (More than 10pF)

Code	C	D	G	J	K	M	X	Z	P	No code
(%)	±0.25	±0.5	±2	±5	±10	±20	+40 -20	+80 -20	+100 -0	More than 10μF - 10 ~ +50 Less than 4.7μF -10 ~ +75

#### (Less than 10pF)

Code	B	C	D	F	G
(pF)	±0.1	±0.25	±0.5	±1	±2

#### Voltage rating

2nd word 1st word	A	B	C	D	E	F	G	H	J	K	V
0	1.0	1.25	1.6	2.0	2.5	3.15	4.0	5.0	6.3	8.0	-
1	10	12.5	16	20	25	31.5	40	50	63	80	35
2	100	125	160	200	250	315	400	500	630	800	-
3	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	-

#### Chip capacitors

- (EX) C C 7 3 F S L 1 H 0 0 0 J  
1 2 3 4 5 6 7  
(Chip) (CH, RH, UJ, SL)
- (EX) C K 7 3 F F 1 H 0 0 0 Z  
1 2 3 4 5 6 7  
(Chip) (B, F)
- Refer to the table above.
- 1 = Type  
2 = Shape  
3 = Dimension  
4 = Temp. coefficient  
5 = Voltage rating  
6 = Value  
7 = Tolerance

#### Dimension (Chip capacitors)

Dimension code	L	W	T
Empty	5.6 ± 0.5	5.0 ± 0.5	Less than 2.0
A	4.5 ± 0.5	3.2 ± 0.4	Less than 2.0
B	4.5 ± 0.5	2.0 ± 0.3	Less than 2.0
C	4.5 ± 0.5	1.25 ± 0.2	Less than 1.25
D	3.2 ± 0.4	2.5 ± 0.3	Less than 1.5
E	3.2 ± 0.2	1.6 ± 0.2	Less than 1.25
F	2.0 ± 0.3	1.25 ± 0.2	Less than 1.25
G	1.6 ± 0.2	0.8 ± 0.2	Less than 1.0

### RESISTORS

#### Chip resistor (Carbon)

- (EX) R K 7 3 E B 2 B 0 0 0 J  
1 2 3 4 5 6 7  
(Chip) (B, F)

#### Carbon resistor (Normal type)

- (EX) R D 1 4 B B 2 C 0 0 0 J  
1 2 3 4 5 6 7

- 1 = Type  
2 = Shape  
3 = Dimension  
4 = Temp. coefficient  
5 = Rating wattage  
6 = Value  
7 = Tolerance

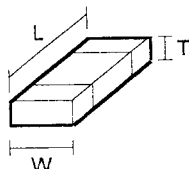
#### Dimension (Chip resistor)

Dimension code	L	W	T
E	3.2 ± 0.2	1.6 ± 0.2	1.0
F	2.0 ± 0.3	1.25 ± 0.2	1.0
G	1.6 ± 0.2	0.8 ± 0.2	0.5 ± 0.1

#### Rating wattage

Code	Wattage	Code	Wattage	Code	Wattage
1J	1/16W	2C	1/6W	3A	1W
2A	1/10W	2E	1/4W	3D	2W
2B	1/8W	2H	1/2W		

#### Dimension



# DP-MA5/MA9

## SPECIFICATIONS

Laser .....	Semiconductor laser
Playing rotation .....	200rpm~500rpm (CLV)
Frequency response .....	20Hz~20kHz, $\pm 1.0$ dB
Signal to noise ratio .....	More than 93dB
Total harmonic distortion .....	Less than 0.01% (at 1kHz)
Channel separation .....	More than 85dB (at 1kHz)
Wow & Flutter .....	Unmeasurable Limit

### [GENERAL]

Dimensions (W x H x D) .....	270 (10-5/8") x 85 (3-3/8") x 310 (12-3/16")mm
Weight (Net) .....	3.2kg (7.0lb)

KENWOOD follows a policy of continuous advancements in development. For this reason specifications may be changed without notice.

### Note :

Component and circuitry are subject to modification to insure best operation under differing local conditions. This manual is based on, the U.S.A. (K) standard, and provides information on regional circuit modification through use of alternate schematic diagrams, and information on regional component variations through use of parts list.

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